

[illegible]

DOWNTIME

by Chad

Mother Goose automated

YOU may have read the story about the television censor device, which prevents children from watching TV programmes their parents think unsuitable (CW, August 3). Its New York inventor, Ray Dobson, was talking of bringing it to the UK, thinking there is a big market for it here.

I thought longingly that maybe there were a few hopelessly old-fashioned parents left here who expected to be able to tell their children what programmes they may watch, and be obeyed.

However, a friend of mine had an idea about the machine. When no authorised programme is running, instead of just showing a blank screen, it could display a message: "Now parents, TALK to your children". (My friend wants a royalty for the idea, Mr Dobson.)

Talking of talking to children, I gather you can now buy audio cassettes of famous actors/actresses reading bedtime stories, to save you the trouble. So when the nippers come to you and say "Daddy/Mummy read us a story," you just press the player and a cassette into their hands.

Very handy, I hear people cry. After all, we have automated washing - up machines and automated cooks, why shouldn't we have automated parents? Besides, Michael Hordern and Judi Dench would be much better at reading stories than me.

Yes, dear parent, but you have one advantage: you (presumably) are a human being, and if we are going to have our children brought up by machines as well as born in test-tubes the human race might as well jack it in altogether.

Zéware de vacances

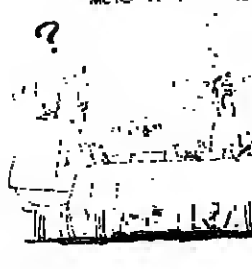
APRÈS TAVOIR
EXAGÉRÉ CE QU'EST
LE HARDWARE...



JE VAIS TE
PARLER DU SOFTWARE!
ET DU FIRMWARE!



BON!
J'VAIS RAJOUTER
MON FIRMWARE?



ET MOI,
J'VAIS FAIRE
MON DEWARES!



One way of telling that you have a good grasp of a foreign language is when you find you can understand jokes in that language. The French computer newspaper, "Zérou Un" has a cartoonist, "Zéware", whose strip on the back page is consistently ingenious. I reproduce here a sample - see if you can work it out. I confess it took me some time. I will print my translation elsewhere in Downtime - I'm fairly sure it is correct.

Technical fault

IF you read Paul Samet's article last week on Professionalism, you may have thought he was being surprisingly harsh towards British universities in saying that none of them dealt with technology until 1970. Let me reassure the professor's enraged colleagues by explaining it was a printer's gremlin at CW that converted an E into a 9; it was 1870 that Samet intended to say. We may be backward in Britain but not all that much!

Spaghetti unravelled

AN unfortunate truncation in last week's report on the Newcastle University seminar on the teaching of computer science makes it necessary to return to the subject of Dijkstra's Dining Philosophers.

Readers will recall that Professor Dijkstra introduced a party of philosophers who spent all their time either thinking or eating. The philosophers were presented with the problem that although a table was set with one place and one fork for each of them, the meal turned out to be an unusually difficult spaghetti which could only be eaten with the aid of two forks.

The problem, which according to Professor Dijkstra is extremely useful in thinking about distributed processing systems, is to find a rule which will prevent any of the philosophers from starving.

The poor men might well have starved by now, since that is

Time future

FOLLOWING last week's story of an LCD watch from Texas Instruments with analogue display, rumour has it that TI will next introduce a watch with real hands instead of simulated ones.

Then the next logical step would be an ecologically sound power supply that uses a human being winding a knob rather than a throw-away battery that wastes valuable resources.

Instead of sending the parties to Taiwan or Singapore for assembly, TI could send them to Switzerland, where I understand there are a lot of unemployed factory workers recently made redundant by some development or other.

ZEVAR cartoon: Pans in foreign languages are always the trickiest jokes to decipher. "Armware" is "armoire", and "deware" is "dewar". Our hero's children would rather clean up their wardrobe than their homework, than listen to his explication on the largeness of his mystical profession.

Kamikaze

IT was touching, was it not, that when the transatlantic balloonists ran out of ballast, they had to throw their navigational computer overboard to keep aloft and complete their historic journey. It's nice to feel that our machines are so dispensable.

It would have been much more poignant, of course, if the computer had decided on its own initiative to sacrifice itself for the sake of its human masters, and jettisoned itself automatically. After all, why shouldn't computers be as selfless and lovable as dogs?

Professionalism: the IDPM view

I WAS so struck by the similarity between the words of a recent Computervue (CW, August 17) and my own views that I thought at first I was reading something I had written myself.

In a talk to the Cranfield School of Management, earlier this year, on the management of management services, I urged DPMs to "stop seeing themselves as specialists in DP, but as managers of an important corporate function - communications and information handling, because business data processing is taking an evolutionary step from DP to information processing."

The DP department can be a key factor in this evolution, but only if it broadens its horizons and becomes a vital part of the corporate transition to the electronic office of the very near future. I also agree with Computervue, in that there are many DPMs not ready to accept that this change is occurring.

As Alex d'Agapeyeff has said, "Ask a typical DPM how many

microprocessors are operational in his company and the answer in most cases will be 'None', yet user departments are introducing them in many places without the knowledge of the DPM or involving his budget". A modern Trojan Horse indeed, yet it need not be. The DPM has a unique advantage in these developments, if he will only grasp the opportunity.

When speaking to a group of IBM users last year, I was faced with a persistent heckler who was adamant that his company was perfectly satisfied with the performance of his centralised computer department and that because he could demonstrate his profitability, there would be no challenge from minis, micros or distributed processing.

Yet an examination of the growth statistics of the industry in the US as recently reported in the US magazine Datamation suggests something close to a nil growth in new installations of mainframes. This assumes a certain level of replacement business and upgrading of



existing installations. Of course, this doesn't mean no new installations in 1977, but something like the same number as in 1976 - a flattening out which was might not have expected a couple of years back.

Certainly we can argue about the absolute economics, but the trends cannot be ignored. In the same way that the mid-1950s saw a change from scientific computing as being the main purpose for computers, so now we can see a widening of the corporate structure so that DP as we know it becomes only a part of the total information processing scene.

The change has begun, and must accelerate. Those of us already in the industry cannot cling steadfastly to what we have and blindly hope that these trends will leave us untouched. Far better to make our own assessment of its impact on the fortunes of the company which employs us to aid its profitability and to recommend the introduction of the right equipment for the right purpose at the right time, not just in the area of data processing but for word and text processing, facsimile systems, data communication systems

linked in with the switchboard, voice input and synthesis systems.

Because of the inevitability of the merging of text, graphics and data technologies, it becomes essential for us to blur these distinctions and to manage along application lines.

It seems to me that our ability to face these challenges relates very much to this open-ended argument, which continually rages in the pages of the journals as well as at various meetings up and down the country, about whether or not we are in a profession and if so, whether that per se makes us into professionals.

I have always considered this to be the most barren debate we could possibly spend time on. A couple of weeks ago I read an advertisement which stated, "Learning to think your way round problems, instead of blundering through them... in our book, is what being a Professional is all about". The advertisement was for a career in the Army, but I would expect few of us to quarrel with this definition, although no doubt many of the protagonists in this never-ending debate would

want to add many other qualifications.

The fact is that an organisation does not of itself become a professional body merely by the use of an examination entrance and a code of ethics. Furthermore, members of such a body do not themselves automatically become professionals merely by being accepted as members of such a body.

It is the professional competence of a number of people who have collected together in an organisation which will in the fullness of time, cause that body to be recognised as professional, in that it represents a group of people who behave and operate in a professional manner.

To return to the theme of information processing, a real professional will not limit his sights to the DP of today. He will be looking for any contribution he can make to his company's profitability, and thus competitiveness, in the marketplace and in that involves moving outside the boundaries of the computer installation in take on the broader role of organising management services, so be it.

To this extent, therefore, I understand and sympathise with the proposal by Roger Griffiths (CW, August 7) to change the criterion by which members of the British Computer Society are judged. His proposal that "proven ability to handle managerial responsibility" should be the qualification by which the BCS membership would acquire more significance and status is appealing, but has little hope of being accepted because it would at the stroke of a

pen change the BCS into a DPMA.

One of the reasons which led the DPMA into the merger with IIP to form the new Computing Institute of Data Processing Management was the recognition of this change from data processing as we have known it to the much wider concept of information processing. Information processing units are likely to be much smaller than the large centralised DP departments of today, and although they need managing both centrally to meet the needs of the corporate body and locally to operate efficiently, the need is in the IDPM see today is to help people to manage right down the line.

This means we have to take much broader view of management than Griffiths does, and broader than the DPMA did. We have to help people to manage quite small units, to train them and to manage themselves and their own jobs, even when they actually have no responsibility for others.

If proposals before the BCS of the IDPM are accepted, the Institute will be providing a forum where users and other ranks of professional organisations can meet with mutual benefit. This is a process which is good for IDPM members as well as being a contribution to their standing as professionals, and will in the long term disprove whether or not the Institute is accepted as a professional body.

After some months of trials and development work on the VME/B operating system, Glasgow University's new ICL 2876 was officially opened last week in an inaugural ceremony by computer pioneer Professor Tom Kilburn of Manchester.

Installation of VME/B has been considerably less painful than at other universities that have acquired large 2800s, and the academic staff at Glasgow say they are happy with the way things have gone.

All the Computer Board's purchase contracts have performance specifications written into them, and there have been serious difficulties getting large 2800s using VME/B to handle the required workload of batch and terminal work because the operating system uses up so many resources. ICL has been forced to add extra hardware free of charge to make up the performance in some cases.

At Glasgow, however, the short fall under the trials was quite small and was rectified by the addition of an extra disc and an interfacing unit.

The system, which was delivered last December and handed over in March, has three Megabytes of main store, 1,200 Megabytes of exchangeable disc, and 10 Megabytes of fixed disc for system use. Controlling the terminals are a 7905 communications processor and a CTL Modular One minicomputer. At present the system can handle about 20 terminals at one time, while running a batch load roughly equivalent to that on an IBM 370/155.

The release of VME/B in use now is 5X23, but by mid-October it is hoped to put up 5X27, giving a capability by the end of the year of 40 terminals at once.

Development work on the systems software has been a joint effort between Glasgow and ICL staff, with a good many enhancements being added.

For instance, one important facility is a "polling system" that stops users from using up too much file storage space, on which there is a premium.

The system cost, £1.7 million and will be used mainly for research in a wide range of arts and sciences, but with teaching and university administration also using a good deal of its time.

According to Dr Ken Brown, director of the Computer Service, the 2876's performance is considerably better than that of the 2800 at the universities' regional centre at Bush Estate near Edinburgh, but the machine has a half a Megabyte less memory.

GOVERNMENT COMPUTING

CENTRAL STATISTICAL OFFICE WHITEHALL

A remote job entry terminal including 80-COL Card Reader and 600 line per minute Printer to link with the mainframe required for installation as soon as possible by November 1, 1978.

Applications for the operational requirements should be sent to CEH/13; should be sent by October 6, to Central Computer Agency, Room 822, Riverbank House, 157-161 Millbank, London SW1P 4RT.

CPI set to deliver two main products

THE peripherals factory set up at Stevenage by Computer Peripherals Inc to compensate for redundancies made there by ICL about two years ago is now employing 260 people.

Run by CPI's European subsidiary, CPI Data Peripherals Ltd, the plant is now starting to deliver its two main products - band printers and compact 6250 bpi tape drives - to the CPI shareholders, ICL, NCR and CDC, as well as to OEM customers outside CPI.

The 6,250 bpi tape drive is called the ATS III and employs the Group Code Recording technique first introduced by IBM. The main attraction of the ATS III is its compactness. The unit is only 24 inches high and can be mounted in a 19 inch rack. Its microprocessor based controller is 5 1/2 inches high, half the size of the controllers provided with competitive products, according to CPI.

The ATS III was designed at Stevenage and will be built there for all of CPI's customers in Europe. In addition it will initially be supplied to customers in the US, although the company said that production will start in the US when volume orders are picked up there.

ICL is to offer the ATS III as the main tape drive for use with its 2900 series mainframes up to the 2970 level while 2980 users will be supplied with the TGT 200, a floor standing 6,250 bpi unit built by CPI in the US. ICL sells the TGT 200 as the MT1250. ICL's own tape drive

manufacturing operation at Winsford in Cheshire is to be gradually run down.

Sales of the ATS III to customers other than the CPI shareholders will be handled by the OEM peripherals marketing side of Control Data, the majority shareholder in CPI.

CDC is increasing its holding in CPI from 42% to 60% (CW, June 1) while ICL and NCR will have 20% each of the company.

The other main product at Stevenage, the 9380 band printer, is being built there in 380 and 720 lpm versions for ICL, NCR and other European customers, while faster units are still being imported from the US where the 9380 was originally developed by CPI about three years ago.

Firms other than the CPI shareholders now being supplied with 9380 units by the Stevenage plant include Systime and Norsk Data. CPI plans to ship about 600 9380s from Stevenage this year.

Hitachi unveils its 'super computer'

THE long-awaited Hitachi "super computer", unofficially known as the M-210, has now been unveiled in Japan as the M-200H. Like Fujitsu's M-200, the Hitachi machine is available with from one to four processors, each capable of addressing up to 16 Megabytes of main memory, and each having a 64K byte cache memory.

It is expected to add a version of the M-200H to its catalogue as the AS7 (CW, June 29), but it will be some time before this happens, since first deliveries in Japan are scheduled for the latter half of next year.

The specifications of the M-200H indicate that it is considerably more powerful than Fujitsu's M-200, which itself leaves the IBM 3033 way behind. It is the first time that Hitachi has offered an M-series larger than the biggest Fujitsu offering: Hitachi's previous biggest machine was the M-180, equivalent to a 3032.

Like Fujitsu with OSIV/F4, Hitachi is working on its own version of IBM's MVS large-scale operating system, which will have additional features to support a unique scientific option offered with the M-200H.

This is an integrated array processor which is claimed to process complex scientific calculations four times faster than would be possible with the conventional IBM 370 architecture used in the M-200H.

The M-200H is rated at between 7.5 and 9 million instructions per second, compared with 3 to 8.5 for the M-200 and 4 to 4.5 for the 3033.

Like the 3033 and M-200, the M-200H supports up to 16 channels per CPU, with an aggregate transfer rate of 26 Megabytes per second, the same as IBM's 3033, but faster than the 20 Megabytes per second of the M-200.

Glasgow finds VME/B less painful than other universities did

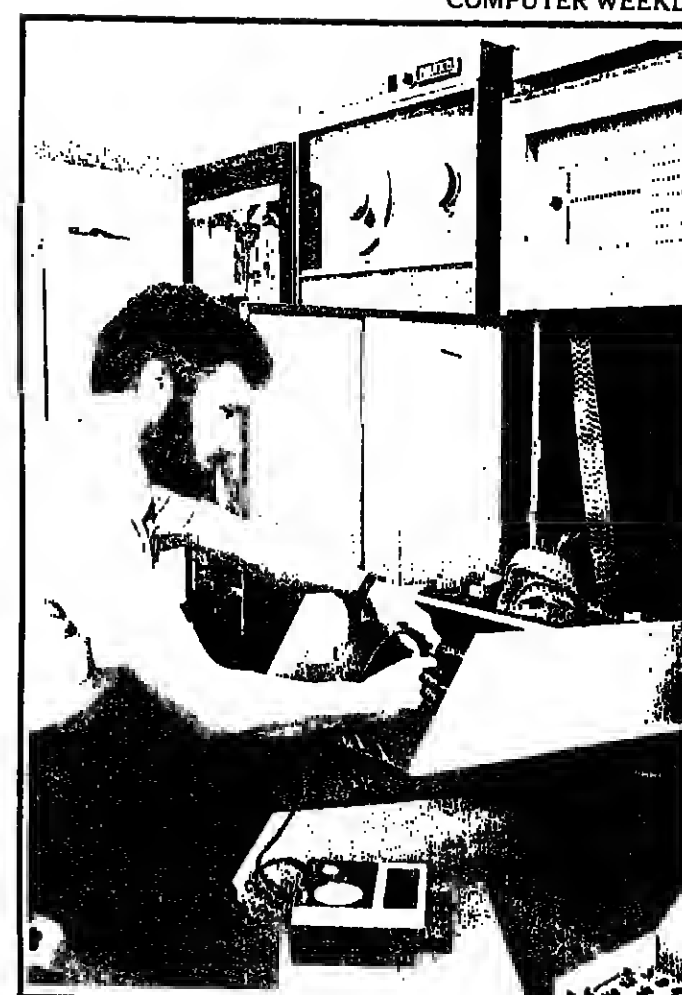
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PREPARING to expand its offerings to UK users of Sigma mainframes from the former Xerox Data Systems, Telefile Computer Products has commissioned a 3,000 square foot technical resources centre in Slough where add-on disc and tape drives and main memory units for Sigma computers will be tested prior to customer delivery (see picture).

Next year, Telefile will also introduce its plot controller emulation of the Sigma 9 processor, built using AMO 2801 bit-slice micros.

The centre is to be run by Ken Lavery, who joined Telefile from Rank Xerox Data Systems, along with several engineers. The picture shows an engineer at the centre at work on a disc controller.

Banks' bureau battle settled

A SETTLEMENT has been reached out of court between Adapso, the US association of bureaux, and Citibank and Chase Manhattan Bank, which it was suing to prevent them from selling bureau services (CW, July 6). The two banks have agreed to operate their computer service organisations as separate companies with different names.

Jerry Dryer, Adapso's executive vice-president, indicated he was well satisfied with these arrangements.

DIALOGUE WITH ZILOG

One day conventions, organised by Cramer Microsystems especially for software houses, systems analysts and consultants.

London (The Royal Academy of Film and TV Arts, Piccadilly) 10th October
Manchester (The Playboy Club, Canal Street) 12th October
Top level speakers from Zilog and Cramer.

Programme

(REGISTRATION AND COFFEE AT 09.30)

- Zilog - computing for the '80's**
How systems designers can keep a generation ahead: an explanation of Zilog's philosophy of concentrating on software, system design, computer architecture and LSI technology.
Pepé Piedra (European Marketing Director of Zilog)
- Products to solve systems problems**
Current and new products, including cartridge discs, drives and integrated intelligent terminals to suit a variety of packaging requirements.
John Lythall and Jim Coupland (Cramer Microsystems) and Peter Beckett (European Technical Manager, Zilog)
- Software tools for the company that knows the software business**
Peter Beckett (Zilog), John Lythall (Cramer)
Micros that give you a choice of four software families: COBOL, extended BASIC, FORTRAN and PLZ (TEA)
- Software applications**
Packages developed for commercial use.
Steve Kirk (Software Architects Ltd)
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- * Hardware exhibition
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GILB'S MYTHODOLOGY

Modularisation:
unsung database
technique

John Pearce

PROFESSIONAL conferences and publications are jammed with database technology. It sells well. In spite of this there are a number of fundamental techniques for database organisation which are virtually absent from the discussion.

This is surprising since they have been practiced in many installations for many years, and they have impressive sets of attributes which can compete, in many cases, with the best claims of the database packages.

The only reason I can find for the suppression of discussion is that these techniques could not be "sold" as an expensive package to you.

The technique which I want to expose in this column is called (by me, because I can't find it in the literature under any name) database modularisation. It is direct competitor with the concepts of IMS, Total, System 2000, Codd-based packages, and all the rest of them.

It combines the fundamental database concept of centralised control and updating, with the currently popular concept of distribution. It will work on any computer which can use secondary files, and there is no rental charge.

Database modularisation is, as its name implies, simply an application of the time honoured modularisation principle but, applied this time to file data as opposed to program logic.

In a nutshell the principle is this. The centralised database resides somewhere (likely as not on a set of magnetic tapes, but possibly on direct access media) and this is called the master database.

Most databases are extracted sub-files (but they may be 100% copies) of the master database. These sub-files are permanently or temporarily in any varied set of computers.

Pseudo updates may be performed locally, and kept online in a change file for reference until they are collected into a periodic update procedure against the master. Protection of the master is conventional, by the keeping of previous generations and changes.

Working files are protected mainly by getting a new extraction from the master, but, if they are small working sets, then local duplication may be more relevant.

Notice in this highly modularised environment the following principles apply. The master is not online to the working environment and not subject to destruction in complex and hectic environments.

In particular master data which is not relevant to the working environment cannot be destroyed, or accessed against security requirements in any way. It is not physically available.

Physical separation is much better than logical separation currently practiced in most database management software. The performance optimisation problem is simple.

My "score card" is that I make use of the method in at least half of the database design I get involved. The other half are often artificially constrained by prejudice for the one big database approach, and I don't always find it fruitful to take on IBM's marketing effort of cash turning.

I'm not saying that modularisation is always best. But it is effective enough to be seriously considered in most applications.

SOFTWARE FILE-1

'Open' moves to
strengthen Basic

THE Open University is working on the definition of a greatly enhanced version of Basic, which it hopes to use on future computing studies courses.

Key areas in which the language is to be strengthened include facilities control structure, data structure, string handling and file processing.

The new language, work on which has been underway for about six months, is likely to be closely related to SBasic, an experimental enhancement of Basic developed at Dartmouth College in the US. If adopted, it will be implemented initially for the OU's three DECsystem 20 machines.

The total work capacity of the set of all database thus tuned, will often clearly exceed the performance of a single central master which is also physically the working set of data.

I have noted, mainly as a result of applying modularisation to practical designs for years, the following areas where superior design attributes can be expected compared to "conventional" database design.

Portability, back-up, recovery performance optimisation, overhead costs, file compaction, program portability, reliability, security, project development time control. You can modularise sub-projects without having the whole database and overheads working.

There are, of course, a number of attributes which in some situations will not effectively compete with a more physically centralised approach. These are mainly the case when a very high percentage of the Master records would be substantially updated in a very short time period.

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characteristic of Basic as indispensable", the paper notes.

The language however had also to allow and encourage the writing of modular and structured programs, and programs which could manipulate data in a natural way.

"Our examination of existing languages showed that although there were a number which satisfied many of our criteria, each and every one had disadvantages. The main crux lay in our conviction that some of the features of Basic were too valuable to be discarded.

"We were thus committed to a search for a language which retained these features, but which was modern and allowed structured programming."

The language provisionally defined offers a variety of control structures familiar from other languages. These include IF... THEN... ELSE, and the CASE construction, the latter providing a useful "otherwise" category known as a DEFAULT.

The other major control structure is a LOOP. Terminated by an ENDLOOP on a subsequent line, the construction equates to a DO and can be used for looping.

Arising from this, specific requirements for the language include line-by-line syntax checking and the trapping of as many errors as possible as soon as a line has been typed.

"We need, in short, a language in which every line is as independent as possible. To put it another way, we regard this particular characteristic of Basic as indispensable."

The language defines a program as consisting of a main program and a series of subprograms, viewed as separate modules. Subprograms, which can be either functions or calculable subroutines, only receive data passed via parameter lists.

A notable difference from Basic is the greatly reduced role played by line numbers. With their control function replaced by program constructs, line numbers are used only for the identification of program statements, for example, in run-time error messages.

This, of course, which will replace the two existing introductory courses, is expected to place a greater emphasis on commercial data processing.

The existing courses - algorithmic approach to computing, and Computing and Computers - have been running since 1973 and show a distinct bias towards scientific programming and computer science, according to the paper.

Without Gosserd, Kampf said that the 1977 turnover was \$82 million, compared to \$68 million in 1976, a rise of about 17%.

The size of this group, compared to the relatively small size of UK firms such as Logica, which is expected to have a turnover of £10 million this year, is one reason why the NEB is trying to create a large UK group via its Inspec subsidiary.

In addition to the Gosserd group, which implemented the planning system for the design and construction of the Georges Bank oil platform, the CAP-Gemini group includes Gemini in the UK, Pandata in Holland and companies in the US, Belgium, West Germany, Sweden and Switzerland.

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POWERFUL software development facilities and a carefully considered software environment are key features of Wang's 2200 VS system (CW, June 22) which was launched in the UK this week.

Including compilers for Cobol, Basic, and RPG II in addition to a macro-assembler, the system is strongly oriented to online applications and to interactive program development.

Each language generates re-entrant application code, so that a single copy of an application program can be shared by several user terminals. The language implementations have also been enhanced with features for handling interactive work-stations, such as Read and Display commands.

With the exception of RPG II, all the languages provide facilities for communicating with programs written in other languages and all file formats are language independent.

In support of program development, the system provides an interactive text editor and debugging processor. Permitting inspection of program code, and inspection and modification of data by memory address, the latter also provides a symbolic debugging feature which displays sections of source code in a program "window".

Much of the power of the system comes from an unusually sophisticated range of utilities. One of these, Ez-format - pronounced with an American "Z" - can be used to produce a source program automatically in a specified language.

Reminiscent of the Escort processor developed by Univac for the BC/7, this generator prompts the user at each stage using a hierarchy of menus. Even a non-programmer could in this way create simple terminal data-entry programs.

Another utility, Control and Report, provides facilities for updating, examining, and listing file contents based on a dictionary of data item names.

A major feature of the system throughout is that the user can be guided through any operation by a series of prompting screens. This mechanism operates by default, only coming into operation if the system has been given insufficient data.

Although not offering a DBMS, the system goes some way to meeting such application needs with a powerful indexed-sequential file mechanism, which is capable of handling multiple indexes. This enables application data to be accessed via different paths, according to the context.

A customer file, for example, could in this way be keyed both on customer number and customer name. The organisation method supports up to 16

activities, including the development and drafting of technical proposals.

In view of the increasing complexity of requests for quotation, proposals submitted to prospective customers often constitute in-depth studies of the problem and its proposed solution and require extensive documentary research and exchange of information" the report said.

The report concluded that, although the 150 people involved in research and development are not involved directly in revenue producing activities, the investment in this activity is an "economically efficient one" because it enhances the group's technological capability as well as of being beneficial great benefit to the individuals.

Of those, 170 were on paid holiday, 60 were away for reasons such as sickness and union activities and 140 were undergoing training, working on contracts that are not being invoiced by the company - perhaps because of an overrun on a fixed price contract - or simply waiting to be assigned to a project.

The other 150 were involved in research and development

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SOFTWARE FILE-2

Two key features
spearhead 2200

POWERFUL software development facilities and a carefully considered software environment are key features of Wang's 2200 VS system (CW, June 22) which was launched in the UK this week.

Including compilers for Cobol, Basic, and RPG II in addition to a macro-assembler, the system is strongly oriented to online applications and to interactive program development.

Each language generates re-entrant application code, so that a single copy of an application program can be shared by several user terminals. The language implementations have also been enhanced with features for handling interactive work-stations, such as Read and Display commands.

With the exception of RPG II, all the languages provide facilities for communicating with programs written in other languages and all file formats are language independent.

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EDITED BY PETER HEWITT

Insac 'happy to
have Logica
as a member'

John Pearce



Len Taylor

IT was made clear this week that Logica is very likely to join the government's software concern, Insac, when its deal involving the National Enterprise Board and its previous backer, Planning Research Corporation, has been completed (CW, July 6).

Although there have been no formal negotiations, John Pearce, chairman of Insac, said that Logica had expressed an interest in joining and that Insac would be happy to have the company as a member.

Pearce noted that members of Insac are not bound by a formal or legal agreement, the only prerequisite for membership being a significant NEB stake in the company.

Insac was then free to invite the company to join. If it accepted, its transition to membership was marked by the chief executive joining the board of Insac.

A major NEB holding in a firm in no way led automatically to Insac membership, he noted, citing the examples of Case, in which the NEB has a 28% stake (CW, April 13), and Ferranti.

Len Taylor, managing director of Logica, said that "We hope and expect that there will be areas in which we can co-operate. Our negotiations so far, however, have been with the NEB, not with Insac."

"In the past, we have had preliminary discussions with a number of organisations which expressed an interest in taking us over, but none of these reached a serious stage. Our deal with the NEB strikes us, however, as sensible, and involvement in Insac would offer a number of advantages, both of them and to us."

There has been a very favourable reaction to our announcement of the reorganisation and, although we had a very good relationship with PRC, we are pleased to be free of our 'mid-Atlantic' image."

Taylor went on to say that PRC's sale of its holdings, which followed an approach by Logica, will be accompanied by major changes in the structure of the holding company, Logica Group, which are yet to be settled.

Thus although Logica staff holdings of the "earning" shares are to be more than doubled, from 25% to 51%, prospective shareholders are unlikely to be called upon to produce large cash sums.

Logica has up till now paid no dividend on these shares but this is unlikely to have worried PRC which has undoubtedly realised a substantial gain since its original investment in 1969.

The sale of its 75% holding of this stock for around £4.2 million gives a notional value of £3.6 million to the complete equity.

Host emulation of target
micro instruction set

A MICROPROCESSOR development system adopting the unusual approach of software simulation has been produced by a systems and software company based in Wokingham, Berks. The company, Albetros (Engineers) Ltd, has so far produced simulators for the Intel 8080 and Plessey Miproc.

The software, which is written in Fortran, enables the host machine to emulate the instruction set of the target microprocessor. It is so far supported on Digital Equipment PDP-11 equipment and Data General's Micro Nova.

The company is also developing software to emulate the Texas Instruments TMS 9900, Motorola M6800, and Intel 8080.

Peter Hills, a director of the firm, pointed out that the approach allows microprocessor application programs to be developed and tested in a fully-supported environment. In addition to the facilities of this host machine, the package provides a variety of features for the user to trace, dump, and debug routines.

The package also provides a microprocessor development which is capable of serving many users simultaneously, he noted. A typical PDP-11 system running under RSTS could easily support 10 concurrent users, he said.

Software emulators are notoriously slow and Albetros' software is no exception. Hills observed that the packages exhibited a reduction in execution time of between 10 to 1 and 40 to 1.

For this reason, it is not generally practicable to assemble programs on the host, using the native microprocessor assembler. Instead, cross-compilers are used to generate object code suitable for the target.

In addition to supplying the development system as a software package, Albetros will supply a complete microprocessor development system based on a Data General Micro Nova. Including standard Data General compilers for Fortran and Basic, dual diskettes, a VDU, and 32K of memory, the complete system sells for around £9,000.

WHAT is the next symbol in this left-to-right sequence? See page 61 for solution.

M 2 8 4

...and the other '520'

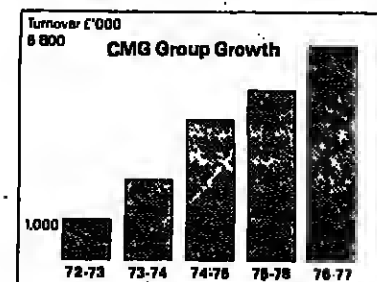
SOFTWARE companies live and prosper by making optimum use of their one major resource - their experts' time - yet, as CAP-Gemini-Sogel has pointed out, on average about a quarter of their staff are engaged in non-invoiced activities at any one moment.

In the group's 1977 annual report, there is an interesting insight into what happens to this time.

"For 1977, the average invoicing rate was about 74%", the report pointed out. "This percentage, which might seem 'normal', means that, at any given moment, 520 out of a total of 2,000 employees are engaged in non-invoiced activities."

Of those, 170 were on paid holiday, 60 were away for reasons such as sickness and union activities and 140 were undergoing training, working on contracts that are not being invoiced by the company - perhaps because of an overrun on a fixed price contract - or simply waiting to be assigned to a project.

The other 150 were involved in research and development

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BOX NUMBER 1970

PEOPLE

Suddenly It's Simple

THE slogan "Suddenly It's Simple" was coined by Orlis Brandes, a Grand Metropolitan Systems, who for £100 in a recent company competition (CW, May 25), and was used to promote the division's services. Orlis' prize was presented to her by the reigning Miss World, Mrs. Stavin.

The computer consultancy Grand Metropolitan Systems is a division of the Grand Metropolitan Group, as Miss World Ltd. During the year, Mrs. Stavin was shown the computer installation, which has one of the first AS/SS installed in the UK.

Peter Huggins, previously managing director of Richmond Business Electronics, has joined GEC Semiconductors as manager of the sales and distribution department.

John Knight has left ICL UK where he was Northern sales manager, to become sales manager in the UK for Atlantic Leasing.

David Harris will join Plessey on July 17 as director of administration and company secretary. His previous position is as senior solicitor with ICL's legal department.

John Heath, previously computer manager of stockbrokers James Capel and Co, has joined Gordon and Gutch Computer Group as a financial systems executive. Michael duBree, formerly of Apco where he was a sales executive, has joined the Group as a business sales executive.

Michael Leach, previously engineering manager for Accupede with Emerson Electric Industrial Controls, has been appointed engineering manager of uninterruptible power supplies, which includes responsibility for engineering aspects of Accupede designs. Kenneth Hackeborn, who previously worked in the assembly and wiring shop, has become manager of the sub-assembly factory.

Dave Holland, managing director of Oligi-Data, has been given the additional responsibility for sales and distribution throughout Europe.

Phillipa Parton has joined BASF as a sales executive, responsible for the sale of EOP media in Central and North London and Middlesex.

Garry Bowman, most recently a sales engineer with G and E Bradley, has joined AVE-Lindberg as sales engineer UVS systems.

Chris Warren, previously a sales representative with Olympia Business Machines, has joined the software products sales team of Westinghouse Management Systems in Edgware, Middlesex.

Miss World presents Darle Brandon with her prize

Peter Lych, late of Honeywell where he was minicomputer support manager, has become senior territory manager for the financial branch — central accounts with Rediffon Computers.

Fred Eldridge of Software Sciences has been promoted to the new post of technical sales manager. He will retain the responsibility for liaison with European agencies and software houses which he held as territory manager.

John Singleton, previously computer services manager of Link House Publications, has been appointed to the board.

MANAGING director of Haurde Computing, Stan Strudwick, was director and general manager of the company from its foundation four years ago until his recent appointment. He has also joined the main board of R. W. Hound and Son, the parent company.

Officers elected

AT the Annual General Meeting of the Article Number Association UK, Donald Harris, director of Teaco, was elected chairman, succeeding Stanley Moughen, who has retired. The vice-chairman and honorary treasurer, John Prout of Nestlé and David Barrett of Fine Fare, were re-elected.

The Continuous Business Forms Manufacturers Section of the British Printing Industries Federation, at its AGM, re-elected as chairman Cuth Brown, managing director of Roffe Print of Falmouth, and elected as vice-chairman Allen King, managing director of Inchbrook Printers of Watton-under-Edge.

The chairman expressed the Section's regret at the death of previous vice-chairman Jim Richardson of John Dickinson Stationery.

BETA's golf tournament

AT the Business Equipment Trade Association's fifth annual golf tournament, held at the Royal Mid-Surrey course in Richmond, the President's Trophy was won by the team from the Peter Williams Group.

The BETA Cup went to the Office Machines and Equipment Federation team, a member of which, Richard Broderick, also won the Rank Xerox Trophy for the best scratch score over 9 holes. In all, there were 99 entrants, and 11 trophies were awarded.

Giltspur at NEC

THE computer and machinery removing department of Giltspur Bullena Transport Services now controls the company's handling operations at the National Exhibition Centre. Questions relating to handling should be addressed to Bob Thompson, the manager of the department, at Hinckley.

July 18-20
Artificial Intelligence, conference, AISB/GI, Hamburg, Ostalia Oresk Sleu, Leeds 31761, ext 7254.

July 19-20
Local authorities group meeting, IBM Computer Users Association, INLOGOV, Birmingham University.

July 20
Southern Group meeting: ICL Oala Entry User Group, HSV Ltd, Basingstoke 1100.

August 4-5
Computers, communications and technology transfer, Jerusalem conference on Information Technology, Informatics Processing Association of Israel/IEEE, Jerusalem.

August 21-24
Operational data security workshop, Operational Data Security Corp, City University, London ECL Register August 18: 01-263 4386, ext 347.

August 21-25
Cybernetics and systems fourth international congress, World Organisation of Cybernetics and Cybernetics, Amsterdam, Ocala: Or 3-Road, College of Technology, Blackburn, tel: 0254 64321.

August 22-26
Conference on parallel processing, IEEE Computer Society/Wyatts State University, Baller, Michigan, USA.

August 23-25
Siggraph '78, fifth conference on computer graphics and interactive techniques, Association for Computing Machinery, Atlanta, Georgia, USA.

August 28-SEPTEMBER 1
Eighteenth Australian Computer Conference, Australian Computer Society, Canberra.

NEB's 64K bit plans slammed

"INCONSISTENT, hastily conceived, and over ambitious." With these words London stockbrokers Wood, MacKenzie and Co have roundly condemned the move by the National Enterprise Board to set up a new company to make 64K bit semiconductor memory chips.

The condemnation comes in the company's first quarterly Electrical and Electronics Newsletter. Though it admits that the details are still hazy, "and certainly puzzling," the report is a fair dissection on the few facts that are known.

The NEB plans suggest, it says, that its prototype company can catch up with the Japanese developments in VLSI technology on £50 million, rather than the £300 million already committed by the Japanese. In answer to this it quotes the statement by Jack Akerman, managing director of Philips subsidiary, Mulford, that it would take £500 million, not £50 million to get into the business.

As has been pointed out before, both the Japanese and Philips have investment programmes that go well beyond the production of one device type, though the NEB will have to invest much more to expand the product range.

The report is most scathing about the employment target for the new company of 4,000 jobs within three years. This, it says, is particularly hard to accept, and reveals the preoccupation of government with job creation through manufacturing rather than the service industries.

On the basis of manning levels currently pertaining in the US semiconductor industry, 4,000 jobs would imply a minimum turnover by the new venture of \$100m to \$120m by the early 1980s. Such a sales level would require a growth rate that even Intel failed to attain with the advantage of a new and largely proprietary technology.

If these figures were attained, the report suggests, the NEB company would indeed be an influential plant in the industry. Intel's 1977 MOS sales were about \$270 and only Texas Instruments and National Semiconductor topped \$100m in this market sector.

SPOTLIGHT ON FINANCE FOR INDUSTRY

ICFC invests £50m in small firms

ALTHOUGH the National Enterprise Board and its Inasac software venture have basked in the limelight of publicity for most of the past year, the Industrial and Commercial Finance Corp also had a record year, investing £50 million in 518 small and medium-scale companies.

The figures for the year to March 1978 indicate a big upsurge in the small private sector, and are almost double the £26 million advanced in 1976-77.

The ICFC, 85% owned by the English and Scottish clearing banks and 15% by the Bank of England, covers the entire industrial and services spectrum. It is currently taking a keen interest in the development of businesses built around microprocessors, and helped two companies get off the ground in this field last year. One microcomputer company with which it is currently involved is operating from an attic.

Advances of as little as £5,000 can be made. Last year over 300 customers received backing of between £5,000 and £50,000.

The most important service offered by ICFC is longer term loans than the banks will normally consider. The rate of interest charged by the corporation is presently between 13% and 14.5%, fixed for the term of the loan. ICFC will also put up share capital, and does not normally require a place on the board.

CTL plans 20% growth

WITH preliminary turnover figures for the year to April 1978 of over £5 million, and a 20% growth planned for the current year, Independent UK minimaker Computer Technology is planning to expand further by acquisitions in the software area. The full figures for the company are to be published in September, but CTL repaid £250,000 in loans last year and has boosted its business prospects by the addition of the low-cost 8020 processor which will take it into the OEM systems builders market.

The Industrial and Commercial Finance Corporation now has a 35% shareholding in CTL.

US manufacturer may take Siemens to court

THE US-based manufacturer, Systems, is threatening to sue Siemens over a possible alleged infringement of the technology used in Siemens' matrix printer developed by Siliconics.

Siliconics, based at Sunnyvale, California, developed the printer in conjunction with the Japanese chemical company, Konishi Roku, which includes Konica cameras and U-Bix copiers in its production line.

A spokesman for Systems Industries, which is a major manufacturer of disc drive systems, said that Siliconics planned to sell the ink jet printer computers rather than selling complete printers to end users. He said that Systems Industries was currently considering whether the Siemens PT80 technology infringes the Siliconics technology.

If it does, Siliconics may take Siemens to court.

The Siliconics printer is not available yet in Europe.

The Siliconics technology involves a photo electric crystal which directs a stream of ink dots on to the paper, forming characters from a 7 x 5 dot matrix. The advantages of this technique over other non-impact serial printing technology are that the Siliconics printer runs at 180 cps — and the fact that ordinary paper can be used.

The Siemens printer, called the PT80, also uses photo electric technology to form characters, but it uses a matrix of 12 x 5 dots. The PT80 was shown at the National Computer Conference at Anaheim, California, in June.

Training funds must come from government, says Penney

FUNDS for training new computer staff, thereby relieving the serious manpower shortage in the industry, can only come from central government, according to George Penney, the National Computing Centre's careers manager.

Writing in the NCC's Journal Interface, Penney warns that one of the most successful centrally-funded computer training schemes, Threshold, is in danger of closing next May because it does not fit into the government's new training programme (CW, July 8).

Penney points out many factors preventing people from getting adequate training on the job. He says that small new installations, that are springing up continually, are unable to take on many trainees, if any, while these firms can attract experienced staff away from established organisations, often by offering better opportunities for promotion.

The industry training levies that work quite well in other, more homogenous industries, could not really work in DP because the majority of computer installations are not in the data processing business, but in engineering, catering, distribution, and so forth.

Employers in these fields were much more inclined to invest their money in training new engineers, cooks, etc, than computer staff. A sole exception was the Civil Service, which did a great deal of DP training, and lost about 25% of these trained staff a year to private industry.

According to Penney, the universities and polytechnics are producing about 1,200 computer staff a year, and the majority go to work for mainframe manufacturers and software houses.

It would be foolish, Penney says, for other employers to adopt the "graduate-only" entry standard. The other main source of staff, TOPS, is for mature students only and will not take school-leavers.

Penney concludes that the expansion of the industry is being held up not by lack of funds or teaching resources, but a failure of direction in placing the funds where they are needed. Hopefully, he adds, it will be possible to find another umbrella under which to operate Threshold.

Aiming at top 1,000 companies

THE top 1,000 companies in the UK and government departments, make up the customer base aimed at by Olivetti's data processing products division which is now headed by former Olivetti marketing manager, Phil Claydon (pictured left).

The data processing division sells Olivetti's range of terminals and distributed processing systems as well as its office computer products.

We stripped the ICL 1500 and rebuilt it for action

Over the past 18 months ICL have been working to improve the 1500 series, one of the world's most successful series of mini computers, with 8000 sales to its credit.

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ICL 1500 for the communications era. The significance of these enhancements, together with other hardware and software enhancements (COBOL is now available) is that ICL 1500 now has a powerful interactive capacity.

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OP SPOT

How to add a pseudo-writer

AN interesting spin-off occurred as the result of an Op Spot hint which explained how to modify the IBM OS pseudo-writer, often known as WTRZ or SCRAPIT, to erase output other than class Z (CV, May 18).

I was contacted by a system programmer who asked how he could add a pseudo-writer to his system, an IBM 370/135, running under OS/VS1, Release 5.

I must admit that I was under the impression that the writer was a standard feature of the IBM OS system, but that is obviously not the case.

My immediate reply was this: modify the JCL of a standard writer procedure by replacing the address of a printer with a DUMMY parameter, and add it to SYS1.PROCLIB as the pseudo-writer (Figure 1 is an example of a pseudo-writer).

But the programmer pointed out that the real problem was finding out how to direct the output listings of the readers, writers, initiators and mounts to output class Z.

I got in touch with several experts and finally found someone who knew the solution.

He said, "You have to modify two load modules which exist on SYS1.LINKLIB, and are loaded into storage at IPL time.

"The modules are called IEEVSTAR and IEEVMNT1, each of which has an *MSGLEVEL=1 parameter which must be replaced by *MSGCLASS=Z, in order to route the procedure listings to output class Z.

"To do this you must use the IBM SUPERZAP utility, as described in the Service Aids manual."

To understand the reason for this we must consider the following START command and the manner in which the OS

Here we have an example of the JCL of a typical pseudo-writer:

```
//IEFPRD EXEC PGM=IEFPCOI,
//          PARM='PM'
//IEFROD DD DUMMY,DCS=(REFCM=FM,RECT=133,RLKSIZE=133)
```

Figure 1

Note the DUMMY parameter which causes the system to erase the output served by the procedure, as opposed to routing it to a printer.

```
//IEFPRD EXEC PGM=IEFPCOI,
//          PARM='PA,IEFPCOI,1,00,001'
//IEFROD DD UNIT=DC,DCS=(JIN,VERIFY),DCB=(REFCM=FM,RECT=133)
```

Figure 2

system "builds" the JCL of procedures started via the console:

S WTR,004,1,0P
The system will take an image of the WTR procedure which exists on the procedure library (see Figure 2); the *MSGCLASS parameter, which actually routes the output to a particular queue, will be taken from the start module which exists in storage, IEEVSTAR; and the procedure identifier, by which the operator is able to recognise each particular procedure, will come from the START command itself. In the above example the identifier will be 004, the address of the printer the writer will use.

One of the most recent is Dave Whitfield who was employed at the bank's centre at Harrow Road, Harlesden.

He is at present engaged on a six-month contract with Central Behner, an insurance company based in Holland.

Departing from Barclays

AS mentioned a couple of weeks ago, there has been a steady flow of leavers from the London centres of Barclays Bank since last October when the details of the bank's relocation programme were made known.

One of the most recent is Dave Whitfield who was employed at the bank's centre at Harrow Road, Harlesden.

He is at present engaged on a six-month contract with Central Behner, an insurance company based in Holland.

By Bernard Allen

Sacked GEC men continue their picketing

WHAT happens at GEC's Stoke, Coventry site now that 16 of the 17 strikers have been sacked by the company?

Firstly, consider the operators themselves, many of whom I spoke to in Coventry on Friday, June 30, immediately after their meeting with Tim Wabb of ASTMS, who advised them to return to work.

Despite the fact that the operators were under the threat of dismissal — a threat duly carried out by GEC on Monday, July 3 — all insisted that they were determined to carry on with the dispute. They are continuing to picket.

Brian Hamilton, the telecommunications equipment controller for the operations department and formerly an operator at the site, is the one who decided to return to work.

He explained that he had nothing to gain by staying out. Despite the fact that his position is covered by the closed shop agreement between GEC and ASTMS, the union has no right to bargain on his behalf, so any improved terms the strikers gain will be of no benefit to him.

ASTMS continues to give the operators its full support and has been joined by TASS in this regard, as confirmed by the mass walk-out at the Stoke site on Tuesday, July 4, and the subsequent two-day strike.

TASS became involved in the affair because 100 contract engineers at Stoke, many of whom are TASS members, have been suspended by the company without pay.

What of the company itself? The spokesman for GEC was reluctant to tell me how the company intends to keep the computer systems at Stoke in operation now that the operators have been dismissed.

Members of the company management, and the systems and programming staff have been providing a user service while the operators' dispute has been on. But how long can they continue?

John Hardie, the GEC shift supervisor who is the operator's union representative, told me: "Although they are not working a twelve-hour shift pattern, as we do, some of them are beginning to look distinctly tired."

The company is likely to be thwarted should it attempt to recruit any new operations staff, because only ASTMS members are allowed to operate the machines, under the agreement with the union.

It may be supposed that the company will at least consider using a bureau service to get the computer work processed.

HINT OF THE WEEK

Program interrupting

This week's hint deals with the operator/program interface in the George 2 environment and is sent by Ron Linton, who is computer operations controller at Manchester Polytechnic.

He says, "There are occasions when the operator must interrupt a program, such as when special forms are being printed online because of a high volume of output."

Now George 2 does not allow the operator to act directly upon a program, but Ron has a way around this, by using two commands. These are the "skip to next command" (Go 28), and "take AT FAIL action" (Go 26).

He continues: "These commands can be used to cause George to effect any required action on the program, although Go 26 should be avoided in case the program should ever genuinely fail."

According to Linton, the following piece of job description will allow the operator immediately to set and unset a switch in the program by the use of Go 28. "Possibly to initiate the printing of dummy forms when printing online."

```
80 ENTER 0
81 AT HALT 'END OF RUN'
GO TO 83
AT FAIL, GO TO 84
82 SWITCH ON 1
RESUME 81
GO TO 82
83
```

He concludes, "Once the program has been entered, the 'next command' will always be either SWITCH ON 1, SWITCH OFF or GO TO the line which switches ON 1."

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The computer industry's most widely-read author and best-attended lecturer, James Martin, was in London last week, to give his fast-moving and information-packed five-day course on "Distributed Processing and Database Networks" at the Europa Hotel under the auspices of the Savant Institute. It was Dr Martin's first London course since he left the

IBM Systems Research Institute on April 1 to devote himself entirely to lecturing and writing on behalf of the industry as a whole. Leaving IBM has not changed any of James Martin's views on the inevitable trend towards more and more distributed processing, nor on the vital need for companies to integrate all their widely used data into

applications-independent databases. But it has removed all his inhibitions on commenting on current industry trends and user experience, even when these cut across some of his former employer's program products. FRED LAMOND attended the conference on Computer Weekly's behalf and interviewed James Martin exclusively.



MARTIN... "Grosch's Law has not just been repealed, it has been stood on its head."

Europe in need of competition in telecoms

THE plunging cost of data processing was commented on by James Martin during his seminar, "During the last five years," he said, "Grosch's Law has not just been repealed, it has been stood on its head. In 1977, the Data General Eclipse mini offered 10 times more ips (instructions per second) per dollar than medium-sized IBM 370s, and Intel 8085 micros 10 times more ips per dollar than the Data General Eclipse."

Fred Lamond took up this point and asked, "Now that this has happened do you see any justification for centralising either data processing or databases other than for a company's general administrative or operating environment?"

James Martin: The more you distribute processing to the points where the data originates and/or the results are required, the more you save on line costs. But there is a strong case for centralising databases when data is required by more than one part of a company, transactions arising from a number of different points update the contents of some database records interactively, or when the database as a whole has to be searched on a content basis. Searching a distributed database would be unbelievably cumbersome.

much whether the distributed minis exchange data with the central system online or via magnetic tapes or diskettes.

FL: Do you think that the new breed of 32-bit minis that are IBM 370 compatible — like the National Semiconductor C400 or Magnuson M80 — will help central DP departments in maintaining compatibility between central sites and distributed processing sites?

JM: Certainly, but strictly speaking you don't need machine code compatibility at all points, any more than you need a single supplier for the central site and all distributed minis. As long as all the minis in an organisation conform to common database record and message format standards, it doesn't matter who makes them and what their own internal machine codes are. It would help if they plugged into a common network architecture.

FL: What about programming them?

JM: You will never get applications developed for all the mini and microcomputers that the industry is capable of manufacturing if every mini and micro is programmed in a unique way for its own user's applications. Centralised development of standard applications programs for minis and micros to be distributed around a corporation to execute common tasks at different sites makes sense and that can bring down costs adequately.

FL: What consequences do you foresee if European telecommunications facilities fall further behind and remain much more expensive than the North American ones?

JM: Computer and network usage will differ more and more between North America and Europe, making it more and more difficult for each side to benefit from the other's experience.

FL: But is that necessarily a bad thing? Higher European communications line costs and lower line reliability have already encouraged European manufacturers to take the lead in developing intelligent ban-

king terminals. European industry might thus be helped to take a lead in the direction of distributed processing.

JM: You may be right as far as data processing is concerned. But you must also consider the other traffic, which does represent 90% of communications line usage, even in America. The cheaper, much wider bandwidth long distance communications made possible by communications satellites will encourage much more frequent teleconferencing among the top executives of large corporations located in different regions and countries.

If European executives cannot use telecommunications as easily in the 1980s as their North American counterparts, they will manage that much less competitively.

FL: You mentioned communications satellites. How long before individual house-owners can pick up TV programs direct from satellites via dishes on their own rooftops?

JM: Soon in Japan, where the Japanese broadcasting authority has planned a TV satellite. Receive-only satellite antennas now sell in Japan for about \$70 each. Two-way satellite antennas capable of sending to as well as receiving from the satellites are more expensive at about \$100,000.

The main application I see for direct satellite programs is in educational and training programmes, which will be the great growth industry of the 1980s to replace the office jobs being lost to office automation. And this is a field in which Britain currently leads the world.

Nowhere in my travels have I yet seen videotraining programmes of the quality and effectiveness of the BBC's Open University, which currently produces some 250 new programmes a year.

It is tragic that most of them are broadcast on BBC once a year at times when most of the population misses them, such as 7 am. The BBC should be beaming them to TV satellites and make them available to the world population as a whole. Or else market them on videocassettes or the new Philips videodisks.

FL: Do you think direct home pickup of TV programs from satellites will be a precedent for the European offices of large multinational firms to put Satellite Business Systems antennae on their rooftops with or without Post Office approval?

JM: It might be difficult to stop them from putting up receive-only antennae. But they would still need a Post Office licence to broadcast acknowledgement signals back to the satellite, or else would have to use Post Office and other com-

mon carrier cables for these acknowledgments. But to the extent that this made data transmission from US to Europe

much cheaper than in the reverse direction, it would encourage the concentration of corporate and other databases in

North America, which is an aspect of data dependence that European countries are currently trying to avoid.

It would be far better and more effective for the European countries to follow the US in allowing competition in telecommunications by allowing, for instance, the "value added common carriers" who have done so much to revolutionise American telecommunications in the last five years.

FL: The European PTTs often justify their monopolies by claiming that it enables them to provide telecommunications at a lower cost to the residential user and small business than they would be able to if private companies were allowed to cream off the lucrative private line business for large corporations. What do you think of this argument?

Most technological advances have come from new entrants into a market. Most established suppliers tend to be locked into the past, especially when they are Quangos (quasi-autonomous national government organisations) with statutory monopolies. What Europe desperately needs is competition in telecommunications.

Public packet switching networks have very high overheads and require a very high volume of utilisation to break even. Canada's Data-pac is losing money, and so will the planned European networks like Transpac until the mid-1980s at least.

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An oral link between machine and man

IN the preamble to Professor George's article, Machine shall talk unto machine (CW, June 29), it states, "It would be ideal if we could devise a method of verbal communication between machine and man." Surely this 'was done years ago with the development of the high level languages, which sought to replace strictly coded programming systems with more natural verbal systems.

The article itself is concerned with speech recognition which implies not merely verbal but oral communication, a different problem altogether.

When discussing language it is important to get the words right.

A. TOMLINSON
Congleton, Cheshire.

The Editor welcomes letters on subjects published in Computer Weekly, or on original topics. All letters must be accompanied by the writer's name and address, not necessarily for publication. All letters are liable to be cut at the discretion of the Editor, unless correspondence states that their letters may not be cut.

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LETTERS

To: The Editor, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU

Employment—or an improved quality of life?

"LET those who would seek to abolish slavery consider the security, the dignity of service, the acquaintance with the arts of civility of which such a course would deprive those who are now slaves". Thus I imagine the moral predecessors of those who today fear the advent of a large labour surplus.

The large-scale introduction of micros will undoubtedly cause loss of employment, despite any governmental attempts to create useless work purely for the sake of propping up the employment economy. Until that economy is abandoned, the inevitable loss of essential employment implies hardship. The essential question which has not entered the discussion as yet is whether employment is a means or an end; why the dole is a poor alternative.

The majority of workers, especially manual, are employed to earn money, not for the fun of

it. If then wealth can be produced without them, the issue lies in a social structure which will pass that wealth on to non-workers. Initially, either the dole will graduate to a national dividend, or the working week may be shortened to a token. If the wealth is not provided, the resultant depression will no doubt end as all others have done, in revolution or war.

The other issue raised, concerning the humiliation of unemployment, is again purely a product of a society geared to use its talents in regular employment. The creative urge — if it indeed exists — has been used in industrial labour, but is in no way a desire to become part of an employment machine. Freedom from the necessity to sell oneself, frequently termed prostitution, can imply the freedom to work for one's own satisfaction irrespective of the commercial value attributed to that work.

The dissatisfaction of the present generation of unemployed arises from a society and an education directed away from development of individual

'Academic image' of BCS

MIGHT I be allowed to comment on two points in Op Spot (CW, June 22) about operators and the BCS? The article starts by stating, "The academic image of the British Computer Society is thwarting the operations specialist group in its attempt to attract new members". I have always been at a loss to understand what this means. A large number of computer staff in educational establishments are reluctant to join because they believe the society is so totally dominated by the commercial folk!

Too often "academic" is used as a term of abuse, to be equated with "irrelevant". If the complaint is that the society values understanding as well as knowledge and competence, there are no apologies needed on our part that such qualities are indeed often associated with qualifications.

Secondly, you refer to "the BCS entrance examination". There is no such thing; all with interest in computers and their use are welcome to join. What we do have are examinations that lead to professional qualifications. I certainly agree with Barrie Palmer that the following avon part of these examination syllabuses can be of benefit to operations staff.

In conclusion, let me add how useful a feature Op Spot is, always informative and entertaining as well. Keep up the good work!

PAUL SAME, President

British Computer Society

facilities in favour of the employment ethic. Full scale introduction of micro-electronics can make a return in society to personal fulfilment without the need for labour possible; in effect, a return to aristocratic society, without the need for a repressed labouring class.

However, unlike the traditionally effete aristocrat, modern man has the tradition of practical endeavour. Freedom from directed labour may mean for many not simply leisure but the opportunity to revive traditional arts and crafts which factory employment has all but eliminated. Under present conditions, these crafts are not economically viable, and therefore no longer undertaken seriously. The growing dissatisfaction with the low quality of mass produced goods is timed very well to suit on age when the time for individual craftsmanship may become available.

What is essential in approaching the potential liberation of full automation is the realisation of how society can use the facility, not, as is too often the case, of how the

dom not an imposition. What must not be allowed to happen is the exclusion of the majority from the wealth earned by automation. A parallel may be drawn from late antiquity in which ownership of the means of production became concentrated in ever fewer hands reducing the erstwhile middle and lower classes to serfdom although total wealth was not decreasing.

The micro question ultimately rests not with theorists, nor with lobbies for or against; they will be used, and much labour will become redundant. It is for ordinary people to ensure that their benefits are shared; it is especially important for the labour unions to determine whether employment or the improved quality of life is the aim, and to forego dogma to achieve practical benefit.

Remember the slaves' freedom without preparation is worse than slavery, but society may envisage a time when slaves can rise if change occurs

L. WARD
Culne, Wilts.



COGARVIEW

This revolution will not stop with telling the time

THE computer industry is unique in a number of ways, one of them being its ability to analyse exhaustively technological and market developments long before they actually happen. For example, take the hoary old chestnut of the computer-in-the-home.

Ten years ago, it was being widely predicted that every home would have its computer by the mid-seventies. Five years ago, when it was clear that at least the time scale has been misjudged, it was being said that this would happen by the early 1980s. Today, I am willing to bet it will never happen, personal computing development plans devolved on the telephone or the home TV set, notwithstanding.

It is not to dispute that telephones and TV sets with extended capabilities (some of them computational) are coming, or that there may be room for home facilities services. But to use a dedicated microcomputer on your income tax or to calculate the effect of inflation on your shopping bills would be a grossly cost-effective application, and could save a great deal of money.

Yet, there is no doubt that people whose jobs bring them no nearer a computer than their quarterly electricity or gas bills are becoming more familiar with the broad techniques of computing. Electronic calculators do amount to a revolution. Three or four years ago, they were curiosities; today most households can boast at least one.

Protagonists who claim a phenomenal rise in the popularity of hobby computers, mostly people with vested interests, are suggesting that hobbies may be the back-door by which computing power may eventually invade the home. But they may be wrong. Probably they are quite wrong.

memory to take elapsed time readings. The watch market has gone electronics crazy. The Swiss, whose precision clockworks have dominated watch-making for so many generations, are gnashing their teeth. The customers have deserted them for Texas Instruments, the Japanese, Hong Kong, Taiwan — anyone who can throw together a chip, a LED and LCD and a moulded plastic case. The revolution that micro-minimisation has wrought is on, and it will not stop with telling the time.

Already, NASA has produced a detailed study of a putative \$10 "wrist radio" which would bring instant two-way communication within reach. NASA's study depends on the launch, in the late 1980s they say, of a giant communications satellite up to 150 feet in diameter and with a 25,000 channel capacity.

PTTs would have to do quite a bit of re-thinking concerning their telephone policy, and in the US, AT&T would have to multiply the intensity of its push into new markets. If this pipe dream should ever be realised on any scale, a little nearer earth is the matchbox-sized pendant transmitter produced by Microtron of

California. It is designed for coronary patients and others who might need urgent medical help at any time. It is a wrist-worn transmitter which transmits a receiving unit up to 200 feet away to make a series of pre-programmed telephone calls to summon aid.

Today's mainframe machines stay aloof of the fast-changing wrist watch scene, but they venture as far as ponding about the future. For one, the vac's resident crystal-gate and Joseph recently predicted that by the 1980s, we'll be wearing wrist-mounted health monitors. His hypochondriac's fantasy would contain sensors to sense the wearer's pulse and temperature, assess skin moisture, even detect, in the early stages, the onset of heart disease. The theory is that people could begin to detect the demands they make on their metabolisms, in order to prevent stress.

But why stop there? Surely the 1980s, alarm mechanisms will be so small that they will be incorporated into the wearer's a-buzz, a-buzz, a-buzz approaches a lurking danger. Seriously, wrist watches will function, wrist watches will really agonise just what a timepiece is, and will be used rather than a pendant.

MICRO NEWS

Industry likely to take up Catt's CAM

WITH a strong recommendation from the Middlessex Polytechnic research team that the research project which was funded under the Government's Advanced Computer Technology Project should be taken up by industry, Ivor Catt's Computer Associative Module invention (CW, December 8, 1977) is likely to become an industrial venture.

Though unconfirmed, there are hints that both Plessey and ICL, together with several British radar companies, are interested in developing the invention, which has been proved to be both technically and commercially viable by the Middlessex Poly.

In the CAM invention, a 128K bit serial shift register memory would be constructed on a semiconductor wafer. This would be a self-organising device, capable of bypassing defective circuits on the wafer. It would be used intact, without requiring the costly packaging and testing found with current semiconductor devices.

Used in conjunction with Property, a computer architecture developed by Catt and currently being funded by ACTP at Brunel University, the CAM invention could be used to create a content-addressable computer system in which much of the data processing is carried out within the memory.

Catt said last week, "I am pleased to see that there is growing interest in CAM. I am gratified by the initial response, especially from the radar companies, where CAM is well suited."

Offer from Bleasdale

CONSULTANT Eddie Bleasdale, who specialises in systems development work on the Motorola 6800 family of microprocessors, has developed his own microcomputer system for use in control and monitoring applications.

The development of the system has been based on the fact that for the majority of applications, the hardware requirements are similar. Bleasdale's system, therefore, uses a modular approach to cover the range of variable requirements normally found.

The range of modules include a variety of I/O systems, such as a parallel I/O board, a serial I/O board, and an IEEE 488 instrument bus module. In addition, one or more slave processors can be added.

Bleasdale will be selling the system configured to meet users specific requirements.

£500 buys a Bomp

UNUSUAL sophistication and a "bargain basement" price characterise the latest microcomputer software package announced by CPU Computers, Woking, Surrey. The company has developed a bill of materials processor which runs on an Intel 8080-based system and costs just £500.

Developed by the firm's subsidiary, Micro Systems Software, the Bomp package is written in Intel 8080 assembler. It offers a substantial set of processing functions, ranging from the maintenance of assembly and component data to the production of parts lists (explosions) and where-used lists (implosions).

Although operable on its own, the Bomp software can also be linked with the company's Inventory Management package. A complete stock management system can be built in this way, including such functions as the issuing and allocation of stock to production lines. Price for both packages together is £750.

Formed in 1973, CPU Computers has been manufacturing its own 8080-based system, the M-One, for about 18 months and has made about 160 installations. A single terminal system costs around £8,500 while one including twin VDUs is available for under £10,000.



Standing beside the Arrow Formula One racing car is Ricardo Patrese who, until the installation of the Solcon microcomputer-based data acquisition system, tested the car's performance by the seat of his pants.

System on-board to test race car

"ALTHOUGH we use similar design rules and the same materials as those used in aircraft manufacture, an aircraft designer would be horrified at the way we test a racing car." This, according to Jackie Oliver, owner of the Arrows motor racing team, was the main reason for a collaborative program with Solcon Micro Systems that aims to put an on-board microcomputer data acquisition system in a racing car for the first time.

Current testing procedure consists, he said, of asking the driver how the car "felt" while being driven, and the driver answering on the basis of data acquired from his finger tips and the seat of his pants. The type of data the car designer needs such as accurate measurement of lateral acceleration during cornering, or suspension deflection of individual wheels, can only be guessed at.

In this new venture, Solcon is installing a battery-powered Zilog Z80-based microcomputer system in one of the Arrows racing cars. Equipped with 20K bytes of RAM, which is expandable up to 48K bytes, the system can monitor a total of 16 channels, with a 0.2 second sampling rate.

In operation, the system will be used to help the racing team perform the vital task of "setting up" the car to suit a particular driver on a particular circuit. Storage of data starts once racing speed has been reached, and a maximum of eight minutes data can be held from the analogue transducers strid round the car.

When testing is finished, the 10 lb microsystem is removed from the car, and selected data called out, either numerically or graphically on a teletypewriter. The data can be selected on the basis of specific transducers within specific time limits, to give information on the car's actions at various points on the circuit.

It can also be used to calculate accurately road speed at any point, a calculation that includes such variables as engine revolutions, gear ratio and tyre growth.

Solcon's interest in the venture is primarily centred around developing its skills in installing systems in hostile environments.

IBM spends \$25m on Intel memories

ONE of the largest single markets for semiconductor memories seems set to open up, following an agreement between Intel and IBM covering the supply of 2147-type, 4K static RAMs. Industry observers are now speculating on the possibility that the mainframe giant, itself reckoned to be the largest manufacturer of semiconductor memories in the world, is running into critical memory shortages.

The agreement, about which Intel officials in Sunnyvale declined to comment, is said to cover the supply to IBM of a total of 500 Megabytes of static memory, priced in the range of \$50,000 per Megabyte — a total of \$25 million.

Intel will be supplying the memories probably as 1 Megabyte board systems, with deliveries expected to start at the end of this year and continuing for about 15 months.

Although there has been no official comment from IBM, it has been suggested that the Intel memories are required for its 303X systems. The demand for add-on memory over the next two years is currently estimated at 12,000 Megabytes for 303X systems, and IBM is expected to shop for only half of that.

It is understood that Memorex, National Semiconductor, Intersil and Cambridge Memories are among the companies planning to supply add-on memory for 303X systems in the \$80,000 per Megabyte price range, while IBM's add-on price is \$110,000 per Megabyte.

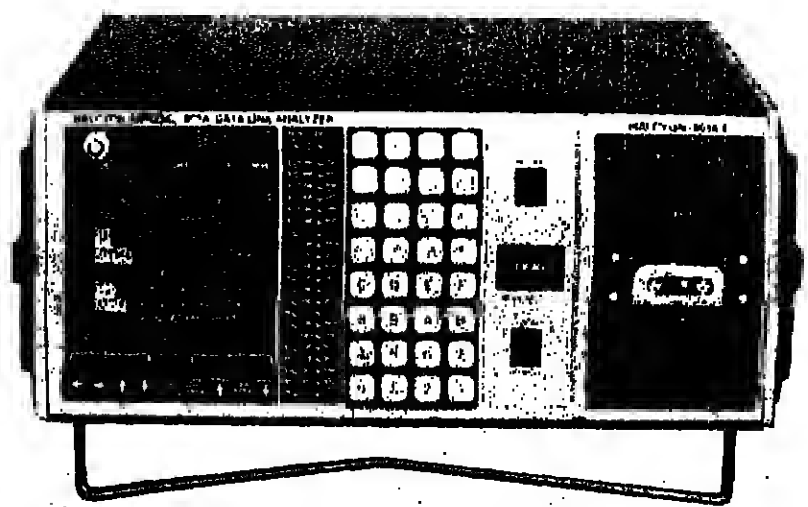
It is being suggested by US observers that Intel's silence on the deal stems from continuing negotiations between the two companies for the supply of 16K bit memory devices. If these negotiations go through, it is likely that the part will represent a considerable departure in packaging style for Intel.

Though the chips would be conventional 16K devices, IBM will expect them in one or two package configurations. Both require that two devices are packaged together to make a 32K bit module. The first is a square package that uses solder bumps instead of leads for connection. The other involves stacking the two devices vertically in an 18 pin package.

The main reason seen for IBM to be forced to outside memory suppliers is that its own 303X memory systems use 2K RAMs, and that its production capacity is already full making these devices. In addition, competition in the mainframe market is forcing IBM to move faster than its previous memory design cycle would allow.

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Barcelona came up with no easy solutions for the services industry

"WHERE you going to — Barcelona. Do you have to — yes I do." The words of the number "Barcelona" from Stephen Sondheim's musical Company rang through my mind as the British Airways Trident deposited me at Barcelona airport for the First World Computing Services Industry Congress. Some 530 delegates from 26 countries were to meet for the best part of four days to discuss the common problems of the industry.

Making my way with other delegates to the Princess Sofia Hotel, I wondered quite what one expected from such gatherings.

Certainly, there were no easy solutions. The problems of the industry — personnel, software, response to minis, etc — are remarkably similar from Hong

Kong to Japan and Mexico to India. There were no panaceas, no shattering truths — just businessmen responding to a challenge in their own way.

The conference divided its time between full plenary sessions and a series of workshops addressing such topics as privacy and security, micro-computers, telecommunications, batch bureau response to change, etc. Sometimes the choice was difficult as two workshop themes caught one's eye yet both were held at the same time. Unfortunately, the proceedings were not recorded or published in any way so that it was difficult to compensate for sessions that had been missed.

In theory, speakers should perhaps issue their papers in writing beforehand and publication might then be possible. In practice, submitting well over 100 speakers from different countries to such disciplines is a daunting task. Most of the sessions I attended were well prepared but a minority of chairmen were less than adequate in their coordination of material and handling of discussions. All this is somewhat outside the control of the organisers.

In so far as things were within their control, the organisation was excellent. Coping with 530 delegates and 150 wives is not easy but the central administration was efficient, the hotel coping well and only the software controlling the lifts caused irritation. It was described by an OR man as "Spanish Queuing Theory" and one Japanese delegate, asked how long he'd been waiting, replied, "Three days". Whether this was language dif-



Over 530 delegates and 180 "accompanying persons" converged on Barcelona for the First World Computing Services Industry Congress. This was the first worldwide jamboree for bureaux and software houses, and was a friendly social occasion. It was sponsored jointly by the European Computing

Services Association, the Japanese Software Industry Association, and ADAPSO from the US, with the organisation largely done by Alan Benjamin and the British CSA. Here one of the conference delegates, STEPHEN VALDEZ (pictured left) from Dtn Science International, gives his personal impressions.

ficulty or inscrutable Oriental humour we weren't sure.

It was interesting to contrast this conference with the one ECSA held in Brussels in 1975. On that occasion, there was a degree of uncertainty in the air in the face of microcomputer developments. There was a sort of quasi-religious questing — what must I do to be saved?

Barcelona was altogether more confident with an industry believing it had met the first challenges well and that it was prepared for what was to come. There was near universal acceptance that minis were to be used as an adjunct to the bureau service.

A key controversy which did develop was whether bureaux were right to offer minis as a profit activity in its own right, or with no bureau processing

attached. Naturally, those doing so defended this view vigorously, in at least one case backing up their arguments with very detailed profit and loss accounts. This, I feel, is a theme to which the next conference will return.

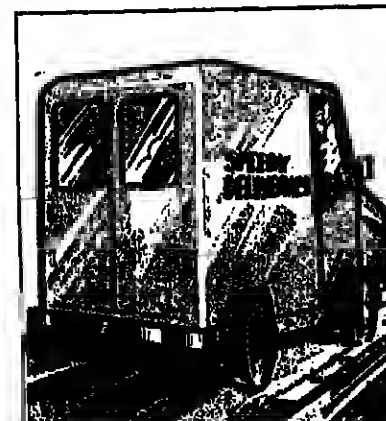
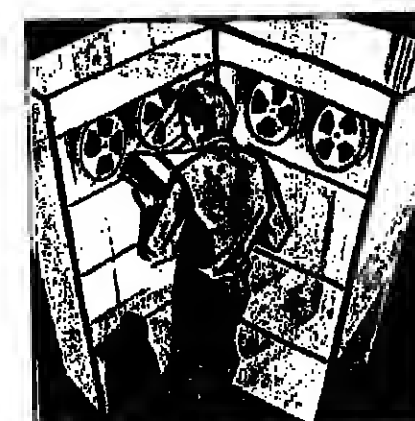
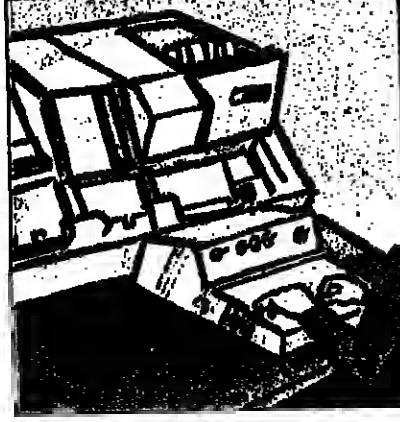
The confident mood of the conference may have owed much to a fine opening address by Frank Lautenberg of Automatic Data Processing Inc., which produced a net profit before tax of \$50 million on a turnover of \$300m. He believed that, just as radio had survived the onset of television, so computer service companies would re-adapt and prosper in the face of change.

The keynote, he argued, was service and not technology — the so-called "obsolete" batch processing techniques are both

alive and well. Some of the euphoria induced by this speech may have been dispelled by Alec d'Agapeyeff of CAP in an address on the second day. In his view, the industry was over complacent in the face of revolutionary change from microprocessors. Mainframe were dead and many service companies would be caught with their trousers down.

Here were two opposing views — evolution or revolution? I discussed this issue with Bryan Mills of CMG, perhaps from the common viewpoint of two people who had trudged the streets with an adding machine under the arm, some age. Somehow, we felt that businessmen remained inherently cautious, that previous confident prophecies had come to nothing (whatever happened to Grosch's Law?), and that perhaps Frank Lautenberg might be the one to be right in the end — "the future may well be more like the past than we suspect."

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770/177/78

R-range Facts

Hardware

R100	8 terminal data entry and distributed data processing system
R300	20 terminal data entry and distributed data processing system
R400	48 terminal data entry and distributed data processing system
R550	30 terminal mixed media data entry system
R830	8 micro terminal distributed data processing system
R850	24 micro terminal distributed data processing system

Software

	R100	R300	R400	R550	R830	R850
Multi-Tasking Operating System	•	•	•	•	•	•
Virtual Memory	•	•	•	•	•	•
Virtual Terminal Operation	•	•	•	•	•	•
COBOL-like Application Language	•	•	•	•	•	•
Formal Language	•	•	•	•	•	•
Interactive Program Development	•	•	•	•	•	•
Test Editing	•	•	•	•	•	•
Systems Log	•	•	•	•	•	•
Operator Statistics	•	•	•	•	•	•
Re-entrant Code	•	•	•	•	•	•
Stack Processing	•	•	•	•	•	•
Independence of Data & Code	•	•	•	•	•	•
Structured Data Sets	•	•	•	•	•	•
Multi-level Indices	•	•	•	•	•	•
Multi-level System Security	•	•	•	•	•	•
Command Sequence	•	•	•	•	•	•
Data Entry Software	•	•	•	•	•	•
Distributed Data Processing Software	•	•	•	•	•	•
Dynamic Disk Management	•	•	•	•	•	•
Seek Optimisation	•	•	•	•	•	•
Full Range of Utilities	•	•	•	•	•	•

Data Communications

Burroughs TC 3500	•	•	•	•	•	•
Burroughs TD B30	•	•	•	•	•	•
IBM 2780/3780/3741	•	•	•	•	•	•
IBM 3270	•	•	•	•	•	•
HASPRJE	•	•	•	•	•	•
SDLC	•	•	•	•	•	•
ICL 7020	•	•	•	•	•	•
ICL 7502/3	•	•	•	•	•	•
ICL 7181	•	•	•	•	•	•
Redifon Synchronous	•	•	•	•	•	•
Redifon Asynchronous	•	•	•	•	•	•
Univac 1004/1	•	•	•	•	•	•

Derbyshire councils vote for 2900s

MORE local government orders for ICL 2900 series machines were announced last week by Derby City Council, which is to take a medium range 2950, and the nearby Amber Valley District Council which is to install a 2804/50.

Due to be installed in September, Derby's 2950 will support online computing facilities for 12 terminals in various departments previously handled by an ICL 1902S, which it will replace. Applications include house rents, building regulations, and planning applications, and Derby will initially use ICL's DME 1900 emulation package.

Derby's 2950 is valued at £370,000 and has 512K of main store, four 100 Mbyte disc drives, four 2700 terminal processors, and a 720 lpm printer.

Amber Valley's 2004/50 system to be installed at Heanor, is valued at £160,000, and features 48K of main store, three 60 Mbyte disc drives, and six display terminals.



This system has been specifically designed by Bose Ten Systems for data logging in the poor environmental conditions usually found in processing plants or ships' engine rooms. Known as MDAS, the microprocessor-based system will accept up to 128 single-ended analogue inputs, or 84 differential inputs, together with 24 8-bit parallel digital inputs, for recording on 0.25 inch

magnetic cartridges using the standard ANSI/ECMA format. Using CMOS devices, it can run from 11 to 30 volt DC power supplies, or the mains, and can be field programmed for such functions as random channel access and level checking. As well as its own playback facility, MDAS is equipped with a communications interface for connection to a remote terminal or modem.

Predicting the drift of a tanker

COMPUTER systems to predict the way a giant tanker will drift when broken down are proposed jointly by Liverpool Polytechnic and the National Maritime Institute. Supertankers are so high

out of the water that they catch the wind more than a clipper ship, and "sail" in unexpected ways when without power, according to the shape of the superstructure and hull.

The new R-range from Redifon Puts the computers where the people are.

The R-range computers are small, powerful and economical — and they are located where the people who do the work are.

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Of course, a distributed data processing system has got to be simple and reliable. The people who will be using it won't be computer specialists — they'll be accounts clerks, department managers, secretaries and housewives.

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With the R-range, you can plan your progress towards full distributed data processing in a series of cost-efficient logical steps, starting, if required, with simple data-entry systems. You can speed up or slow down the programme at any time according to your changing needs.

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The panel on the left gives you brief details of the R-range systems. But there is a lot more to it than that. To get the full story, complete the coupon. We will arrange demonstrations, send you literature or arrange for a representative to visit you, whichever you prefer.

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ABS-BCSL link-up to boost sales

TO expand its manufacturing operation and strengthen its UK marketing, Allied Business Systems has taken over the Brighton factory of Business Computers (Systems) Ltd, along with its production staff, and has signed an agreement with BCSL under which the latter will sell ABS Multibus systems as well as its own Molecular computers. Under the agreement, ABS, which is owned by the Trafalgar House group, has an option to purchase the whole of the share capital of BCSL, 49.5% of which is held by BCSL's managing director, Mike Munnelly, and two other directors. ABS must exercise the option between now and the end of 1980.

ABS's managing director John Blagden, told Computer Weekly that ABS was likely to exercise the option. It all depended on the sales performance of BCSL.

BCSL now effectively has the status of a systems house being supplied by ABS on an OEM basis with Multibus and Molecular processors, plus peripherals. Both firms use a similar range of peripherals and purchasing them jointly for both product ranges will save a lot of money.

ABS will continue to sell Multibus actively and has come to an agreement with BCSL which will prevent the firms from treading on each other's toes.

Blagden said: "ABS has had serious problems finding good professional salesmen with which to extend its existing salesforce and BCSL has a very

experienced team of former Singer Business Machines men suitable for selling Multibus systems."

Blagden added: "We will continue to manufacture and supply BCSL with Molecular processors whether we buy BCSL or not. If we do acquire BCSL we will start thinking about developing one product range to replace the Molecular and Multibus ranges, although as a fairly small company we are flexible enough to continue manufacturing both."

"On the software side we could develop a simple compiler for Molecular machines. 'Simple' is the high level real time language developed by ABS for Multibus systems."

ABS is transferring all Multibus manufacturing and assembly to Brighton from its existing factory at Byfleet, Surrey, which is much smaller than the Brighton plant, and is turning Byfleet over to software development.

The BCSL systems software development team will stay at Brighton, while the applications software section and marketing operation will continue at BCSL's head office at Borehamwood, Herts. Computer Field Maintenance will continue providing maintenance services to Molecular users.

Entering an IBM market

ONE of the newest entrants to the IBM compatible processor market, National CS8, which sells the PI/32 built by the US-based Philips subsidiary, Two PI Co Inc (CV, April 27), is to start shipping systems to US customers in November, according to a National CS8 spokesman. He said that two National CS8 personnel were currently investigating the marketplace in Europe for the PI/32, which outperforms the IBM 370/138 and runs the National CS8 time sharing oriented operating system, VPS. Active selling in Europe will probably start in about a year from now.

The National CS8 spokesman also reportedly detailed reports that his company was planning to buy IBM compatible processors from National Semiconductor or Magnicon Systems instead of from Two PI.

A new IBM plug-compatible CPU for Europe, page 27.

£100,000 minis ordered

LEGAL accounting bureau services will be one of the main application areas for seven minicomputer systems worth £100,000 ordered from Digico by 'Automatic' Information Management of Hull. They will also be used by AIM to capture and validate order data and management information for the bakery division of AIM's parent company, Wm Jackson and Sons.

Four of the Digico systems will be installed at Wm Jackson Bakeries, at Hull, Stockton, Rotherham and Wakefield, and will be linked to ICL 1904S and 1904A computers at AIM's main computer centre at Hull. The three others will be for AIM offices at Hull, Newcastle and Bradford.

NEWS IN BRIEF

AGAS ruling void—judge

A HIGH Court judge has ruled that the Advisory, Conciliation and Arbitration Service was wrong in not recommending union recognition for the UK Association of Professional Engineers in a dispute involving a Bedford engineering company. Although a survey showed that staff wanted UKAPE recognised, ACAS was against this because the union is not in the TUC, and there were threats of trouble from other unions. Mr Justice May ruled this was not a valid reason.

Japanese deal

THERE were growing possibilities that more UK-made electronic components would be used in Japanese equipment, Minister of State for Industry, Alan Williams, told Roderick MacFarquhar (Lab, Belper) in reply to a Parliamentary question. This followed a visit by the Minister to Japan.

Airfield control

FOLLOWING the completion of an initial order from the Department of the Environment's ATS Telemetry of Haywards Heath has won a repeat order for its Type 1000 modular telemetry systems. For all RAF airfields in the UK the systems will be used to control airfield lighting including approach, edge, apron obstruction and VASI lights.

Data entry

A DATA entry system with 2.5 Megabytes of disc storage and one or two video terminals has been introduced by Data 100. Called the 77-107 it comes with data entry software. Optional include IBM 2780, 3780 and Hesp communications.

Series 21 boost

OFFLINE communication with a mainframe is one of the uses for a nine-track desk-top magnetic tape drive introduced by MDS as an enhancement to its Series 21 distributed data capture system. Another enhancement now available from MDS is a 10 Megabyte disc drive for the user programmable version of Series 21, the 21/40.

Littlewood system

WEEKLY stock orders from 106 Littlewoods stores all over the UK are being collected for computer processing by a Redifon data entry system installed at Littlewoods headquarters in Liverpool. The Redifon system has 25 terminals.

Gamma order

AN online financial dealing system is to be supplied by Gamma Associates to the discount house of the City of London. The system will support dealings in Treasury bills, bills of exchange and clearing and clearing of bank of London and will be linked to the bank's computer system at the City. The three others will be for AIM offices at Hull, Newcastle and Bradford.

NORWICH UNION LIFE INSURANCE SOCIETY

invites applications for the position of

SENIOR COBOL PROGRAMMER

The successful applicant for this permanent position will join a small team and will be responsible for maintaining and enhancing existing programmes.

The current main application is a life accounting on-line system and in the near future the present Honeywell 51/5B will be upgraded to a 52/40.

At least 3 years' knowledge of COBOL programming, essential and experience of Honeywell equipment is desirable.

People with full details in writing and marked confidential to:

The Secretary,
Norwich Union Life Insurance Society,
P.O. Box No. 112,
Dawson Street, Dublin 2,
Tel. Dublin 717181 - Calm Cuthrie

Systems Analyst/Programmer

Police Project — Bedford
Starting Salary negotiable up to £4,500

We are looking for a programmer wanting to widen his/her experience and progress into systems work using both free standing minicomputers and a large main frame.

Phone for application form to Bedford 83222 ext. 100.
Further information from Computer Manager on Ext. 248.

Bedfordshire

Bedfordshire County Council

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Asst. Managing Director
01-261 8028

LONDON
Eddie Farrell
Mark Williams
John Parris
Nanette Gibbs
Joan Poole

01-261 8097
01-261 8018
01-261 8008
01-261 8174
01-261 8164

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Owen Kelly
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BIRMINGHAM/BRISTOL
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Share in our Success at Poole

to £6,000p.a.

We are proud of the achievements won by our advanced technology. Our wide area traffic control systems have been adopted by large cities at home and overseas and we have now landed a major contract for Sao Paulo in Brazil. This and many other projects, particularly in data network switching and control, creates a stimulating environment for ambitious engineers.

To ensure continued growth we are looking for Software Engineers with experience in any one of the following: DEC, PDP11, CORAL, RSX11M, ASSEMBLER or FORTRAN.

In a relaxed atmosphere, discover what we can offer you. A good job with real promotion prospects and possibilities of overseas travel; life on the Dorset Coast with Bournemouth and the New Forest nearby; reasonably priced housing and your move financed by our first rate relocation allowances.

If you can't make it then, ring right away or drop a line to:
Richard Edwards,
Technical Recruitment Officer,
Plessey Controls Limited,
Sopers Lane, Poole,
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Telephone: Poole (02013) 5161,
ext. 2344.

We also have openings for
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with a background in the maintenance of micro-processor and mini computer systems and peripherals.

Electronic Test Engineers

Why not come for an informal discussion? Wives are also welcome. Meet some of our engineering team and personnel people at either of the following hotels.

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(near M4 Junction 11) on Tuesday,
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The Post House Hemel Hempstead
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What can you do after 12 months? New challenges - better prospects - increase in salary

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COBOL Programmers with 12-18 months' experience, preferably on ICL equipment, a knowledge of George III is an advantage. Productivity payments, 1-00 accident insurance, season ticket loans are some of the benefits that are offered.

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PROGRAMMERS
c £5400 Dartford

COBOL programmers with 1-2 years' experience, preferably on IBM or ICL equipment. Good relocation expenses, free life insurance, excellent promotional prospects.

AOC 1131

PROGRAMMER
Neg £5500 Basildon

Programmers with 1-2 years' OS COBOL, preferably with MVS plus any amount, no matter how small, of analysis experience have this chance of becoming experienced Analyst/Programmers. An added advantage for applicants would be a knowledge of BOMP plus manufacturing applications.

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PROGRAMMERS
£4000-£6500 Witham

12 months' plus programming experience in COBOL, ASSEMBLER or PL1. The company offers good salaries plus large company benefits. Programmers need to work on the company's large IBM configuration, an ideal opportunity to gain experience with TP and data base applications.

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PROGRAMMERS
c £5600 Surrey

12 months' COBOL, MARK IV, ASSEMBLER, RPG 2, or ACL. Applicants require a knowledge of IBM 370 with DOS/VS also at least one of the following applications, data base, real-time/on-line procedures, data communications, mini-micro computers or modelling systems.

AOC 1703

In this advert we have given brief details of a very few of our current requirements, if you are not completely satisfied with the deal you are getting then call us, we will determine your capabilities and suggest a wide range of job vacancies.

PROGRAMMER/ANALYST
c £6000 Hayes

Applicants need to be early or mid-20's with a minimum of 2 years' COBOL programming with some analysis experience plus knowledge of financial systems. This is an ideal opportunity for people who are interested in the accountancy side of programming work. We are especially interested in Graduates with a reasonable degree and a minimum amount of programming experience but who would be willing to become heavily involved with accountancy work and financial computer applications.

For more details phone now.

AOC 1136



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SENIOR SYSTEMS ANALYSTS £4,800 to £6,500 p.a.

i) **PRODUCTION PLANNING** — The Production Systems Analyst should have a minimum of three years' experience in a production environment and be preferably Requirements Planning oriented.

ii) **ACCOUNTING SYSTEMS** — Applicants should have a sound commercial systems background and have implemented at least one major financial system.

iii) **GROUP SYSTEMS ANALYST** — Initially working on Financial Systems for the smaller companies within the Group, experience of Integrated Accounting / Fixed Asset Systems would be beneficial. As this position involves user contact throughout the U.K. some travel is envisaged.

iv) **TECHNICAL SUPPORT ANALYST** — to assist in assessing the forward development requirements for Computer Hardware within the Group. Applicants should have a good Software / Systems background, be well versed in terminal technology and have varied maintenance experience.

v) **TRAINEE SYSTEMS ANALYST** £3,800 to £5,000
Open to applicants with a minimum of twelve months' Systems / Programming experience and should have a degree in a relevant discipline.

LEEDS
SYSTEMS ANALYST to £5,800

The Analyst will be involved on Accountancy-based systems linked to the Group Financial Systems. It is however expected that he/she will cover multiple tasks and gain valuable all-round Systems capability.

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To implement RJE and Terminal Enquiry Systems between the Group's major Yorkshire plants. Applicants should therefore have experience of Data Communications.

Excellent career prospects can be expected within Group Management Services and normal large Company benefits are offered including excellent RELOCATION EXPENSES.

For further information on the above positions telephone: 031-228 5381 (Scottish positions) or 061-832 5856 (Yorkshire positions). Alternatively write enclosing detailed Curriculum Vitae to: ATA COMPUTER RECRUITMENT, Angle House, 26 Frederick Street, Edinburgh EH2 2JR

LONDON (01) 637 0781 MANCHESTER (061) 832 5856 BIRMINGHAM (021) 643 1994
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Systems Analyst

Process Control Bahrain c £11,500 p.a. tax free

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The Bahrain Petroleum Company Limited, a large company in the oil industry, invites applications from chemical engineering orientated computer professionals to fill a new position of Technical Systems Analyst in its rapidly expanding Computer Services Department based at Awali, the Company township in Bahrain. The town covers an area of nearly a square mile and provides homes, community services and recreational facilities for employees and their families.

The successful applicant will be primarily responsible for the overall design, development and maintenance of all software for the Company's existing and proposed process control computers, and for further development of chemical processing related information systems on the Company's data processing computers. A subsidiary function will be to develop technical and planning systems throughout the Company.

The prime requirement for this position is a successful record in all stages of development and implementation of major process industry computer systems. Experience of process control computers and associated software would be a distinct advantage as would a knowledge of Operational Research and Mathematical planning techniques. Detailed knowledge of Fortran is essential. Successful candidates should have a degree, HND or equivalent in a numerical discipline.

The Company has a Fox 2/30 process control computer installed in its refinery and future expansion will include the installation of a number of mini end micro computers. In addition, there is a system 370/138 and a linked system 3-12, both with batch and on-line processing. A major upgrade is also planned in this area.

Contracts are for one year renewable by mutual agreement. Free medical attention for employees and married or bachelor furnished accommodation provided.

Please write with personal details and request an application form to:

Personnel Relations Department,
Caltex (UK) Limited,
30 Old Burlington Street,
London W1X 2AR.

Quoting reference SA/CW



Trainees for Key Software Positions

OLYMPIA, leaders in the office equipment and word processing fields, are launching an exciting range of office and visible record computers throughout the United Kingdom, and are now setting up a Software Department whose responsibilities will include a wide range of support services for users, dealers, and a direct sales force.

A requirement exists for a number of trainees who will be rapidly progressed to positions of key importance in the Software Department.

Some previous experience in the industry, preferably with an assembler language, would be useful, but, above all, a willingness to get involved in all aspects of systems design, programming, implementation, and sales support, is essential.

Successful applicants will be based in Central London, but be called upon to travel, when necessary, throughout the United Kingdom, to support a direct sales and a dealer network.

Remuneration will initially be £3500 per annum, and will be reviewed after six months of formal and 'on the job' training. Usual large company benefits, including pension scheme and luncheon vouchers, will apply. Employment will commence in early September.

These positions are open to both male and female applicants. Please write with personal details and career to date to:

Mr. T. J. Morris, Software Manager, Olympia Business Machines Co. Ltd., 203/205, Old Marylebone Road, London NW1 5QS.

Olympia
Better Business Machines

Operations Support

London E.15 circa £5½ K + benefits

In anticipation of expansion and an increased workload, our clients, a major international bank, have recently installed an IBM 370-138 and are planning to replace their existing 370-135 with a 370-148. This has created the need for high calibre personnel to assist in improving the integrity of their computer operations facility.

As the planned upgrade of hardware would suggest, the environment is rapidly developing and excellent opportunities exist for the right candidate to provide a problem-solving capability, while assisting the review and improvement of all technical aspects of computer operations as well as the operational efficiency of existing and new systems.

Candidates should preferably be working in a support function and have extensive knowledge of DOS/VS, POWER/VS and/or CICS/VS.

The position commands a competitive salary in addition to which there is an annual bonus of up to 8% of basic salary rising to as high as 15% after two years, a low-cost mortgage scheme, currently 3%, plus other excellent benefits, which include interest-free season ticket loans and subsidised lunches.

Write enclosing a c.v. or telephone for an application form on 01-282 0181 quoting reference CRS/61.

L. Duckworth Bag, Lockyer Bradshaw & Wilson Limited,
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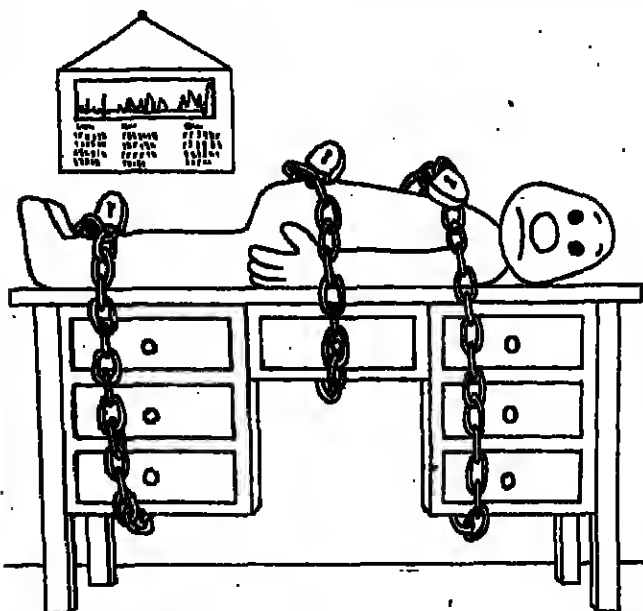
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CHAINED TO A DESK ALL DAY? ... CONSIDER

PROGRAMMING CONSULTANCY

3-4 years' COBOL

LONDON & HOME COUNTIES UP TO £6,500



We are seeking a Programmer or Analyst/Programmer keen to accelerate his/her career by a move to Team Leading. You will be expected to play a major role in the development of new systems, being responsible for the programming and implementation of projects from specification to overall testing.

The person appointed will have in-depth knowledge of COBOL with an appreciation of commercial data processing. Previous supervisory experience is not essential although a commitment to maintaining high standards of coding and documentation are required.

The Company, a Systems and Programming Consultancy, offers a professional environment with the exciting prospect of allowing your career and responsibility to grow with the Company.

Ref. W3/1307

MYRIAD APPOINTMENTS LIMITED Computer Personnel Consultants
Telephone or write to: 30 Fleet Street London EC4Y 1AA 01-353 0981 (24 hrs)

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CHELTENHAM

The Aviation Division of Smiths Industries has a heavy commitment in programmed avionics equipment now essential to the operation of modern high-speed aircraft, both military and civil.

So we are rapidly expanding our software activity to develop a variety of applications employing the most advanced systems technology.

These positions will attract specialists at various levels up to senior, with several years' relevant practical experience and a degree or equivalent in electronics, computer science, mathematics or other related subject. This includes newly-qualified graduates aiming for top-position experience.

You would work with small project teams, have computer access and considerable responsibility for your part of the software.

Real-time Airborne Software

Here you would design and program airborne mini and micro-computers for cockpit display, weapons guidance and flight control. A high level of job satisfaction through direct contribution to aircraft performance and customer liaison is assured.

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backs the equipment activity with the design production, adaptation and maintenance of compilers, assemblers, interpreters and design/analysis/documentation tools for airborne computer programming—including the support of a growing range of micro-processors.

We offer attractive starting salaries, plus the full range of benefits customary in a major international organisation—including relocation assistance to this pleasing area of the Cotswolds. If you are seeking advancement in a growth activity write to:



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Up to £3,500 p.a. inc.
An enthusiastic person required to join our Computer Operations Department. Will be working on IBM 2701/2800 under DOS/VSE, POWER and CICS. Minimum of six months computer experience preferred, preferably gained on a similar system. 35-hour week, 21 days holiday, subsidised restaurant and housing costs and local club. Please send CV to: 07-83444 ext. 278 for further information.

UNIVERSITY OF
BIRMINGHAM
COMPUTER CENTRE
RESEARCH
FELLOW

A Research Fellow is required for an SRC sponsored research project concerned with the production, testing and documentation of a transportable library of mathematical function routines. A Ph.D. or equivalent experience necessary, plus a strong background in mathematics and numerical analysis. Fluency in one or more of: FORTRAN, ALGOL, BASIC, ALGOL 68 necessary and, above all, an interest in and the ability to solve technological problems of a software engineering character offered by this project are required.

The appointment will be for 14 months and is available from 1st August 1978. Salary on the IA scale £3,660-£8,178 (to be reviewed from 1st October 1978) with superannuation. Maximum planning salary £4,265. Applications (2 copies), including CV and naming three referees, should be sent by 31st July to the Assistant Registrar, Science and Engineering, University of Birmingham, P.O. Box 363, Birmingham B15 2TT, from whom further particulars can be obtained. Please quote ref. CM29.

THE UNIVERSITY OF LEEDS

COMPUTER
OPERATOR

Applicants are invited for the post of Computer Operator or Senior Computer Operator in the administrative data processing unit. This is a responsible position with a shift system involving day and evening shifts and requires an operator with experience of an ICL 1902A and/or similar machine.

Salary will be on the scale £2,317 to £3,080 or £2,800-£3,434 (both scales under review) depending on age and experience. A shift allowance of £288 p.a. is payable. Attractive conditions of service including pension scheme, sick pay scheme and generous leave entitlement.

Written applications stating age, experience and previous employment should be sent to: Mr. M. Smith, Senior Assistant Registrar, Data Processing Services, University of Leeds, LEEDS LS2 9JT.

GRADUATE
PROGRAMMER

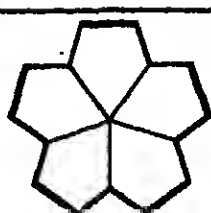
Consulting Engineers have a vacancy for a Graduate Programmer with a degree in Mathematics or Computer Science and about two years' post-graduate experience. He/she will work on the development of software for FORTRAN programs which will be applied in Transportation Planning, Statistics, Project Management and accounting. Highway and Structural Design. Salary will be dependent on experience.

Please send brief details of qualifications and experience to: P. R. Bennett, Brian Colquhoun and Partners, 22 Upper Grosvenor Street, London W1X 6AP. Tel. 01-481 4884.

TRAINEE SALES

for someone with OPERATIONS/RJE experience. London or Manchester based.

Telephone 01-828 7667

SOUTH WEST UNIVERSITIES
REGIONAL COMPUTER
CENTRE

UNIVERSITY OF BATH

ICL 2980
OPERATING

The Regional Centre operates a large 2980 system under VME/8, providing computer services to Universities in the South West via powerful communications facilities.

Applications are invited for the post of

SENIOR OPERATOR

The post offers excellent OPPORTUNITIES for CAREER ADVANCEMENT with ICL new range. Candidates should possess initiative, technical ability, plus an enthusiastic approach to operating.

Salary SO £2812-£3445 + 2 Shift Allowance of £371 (under review).
Application forms and further particulars (quoting Ref. 70/148) from Personnel Officer, University of Bath, Claverton Down, Bath BA2 7AY. Closing date 17th July, 1978.

REQUIRED

MINI COMPUTER PROGRAMMER

with one to three years' experience in Fortran and/or Assembly language, preferably on Data General equipment.

Position will require specialised training in Offfield related work and will be U.K. based, with 15-25% international travel. Applications in writing only, to

Mr. C. R. Hecker, Manager Computer Services
Sperry-Sun International Inc.

Stream Mill, Great Yarmouth, Norfolk NR31 0NP

UNITED KINGDOM ATOMIC ENERGY AUTHORITY
NORTHERN DIVISIONCOMPUTER
PROGRAMMER

A requirement for a Computer Programmer has arisen in the Computer Section at Windscale Nuclear Power Development Laboratories, Cumbria. The Section will shortly be basing its computing services on an ICL 2980 supporting both RJE and Interactive terminals and this post will provide an opportunity for the selected applicant to acquire experience in Systems Analysis and in the writing of data bank software.

QUALIFICATIONS AND EXPERIENCE

Applicants (male or female) must possess a Higher National Certificate or Diploma in a scientific, engineering or mathematical subject, or an equivalent qualification. The languages used are COBOL and FORTRAN; familiarity with ICL or IBM operating systems is desirable but not essential.

TERMS OF APPOINTMENT

Appointment will be to the Scientific Officer grade with salary within the range £3,037 to £4,724 per annum.

Excellent service conditions include 20 days' annual holidays and other benefits appropriate to a staff appointment.

For application form, please write (no stamp needed) to

Staff Officer

United Kingdom Atomic Energy Authority

Northern Division

FREEPOST, Risley, Warrington WA3 1BR

quoting Ref. No. 31032A/J170.

Closing date 28 July, 1978

Make your future with **UKAEA**

Manager
Military Software Section

GEC Computers United's continuing expansion in the Military and Defence fields. Engineering Group to seek a suitable candidate for the above post.

Reporting directly to the Manager of the Military and Peripheral Development Department, a successful applicant will be required to set up the section by recruitment of the appropriate personnel and will be responsible for its continued operation and development. In addition, the man or woman appointed will be involved in discussions with military or defence customer representatives on projects which have, or could have, a software content.

A degree or equivalent in a relevant discipline is required, together with a minimum of 6 experience in the software field — preferably with a knowledge of COBOL. Experience in with military customers would be an asset but is not essential.

Please telephone Graham Ince on Luton (0582) 417882 or write to him at P.E.N., 58 Park Street, Luton, Beds.

Applications from 1st June and onwards.

Professional & Executive Recruitment

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SYSTEMS ANALYST	several yrs' exp. in Prod. sys.	To £7,000
SYSTEMS ANALYST	3 yrs' exp. Financial sys.	c £5,700
ANALYST PROGRAMMER	2 yrs' COBOL + some assembly	To £5,500
SEN. ANALYST/PROD.	lead time + FORTRAN + VNC	neg
SYSTEMS PROGRAMMER	take over sys. generation on IBM	neg
ANALYST PROGRAMMER	370	neg
TRAINER PROGRAMMER	prof PL1/RPG II	neg
	Maths/Avionics Graduate	c £5,000

HERTS

PROJECT LEADER	design, devel & implementation	c £5,500
PROGRAMMER	2 yrs COBOL or ASSEMBLER	c £5,000
SEN. SYST. ANALYST	major system implementation	neg
SYSTEMS ANALYST	mini computers	neg
SOFTWARE PROGRAMMER	ASSEMBLY lang. on Main Frame	neg
ANALYST	comm background prof.	neg
PROGRAMMER	12 mths IBM ODS/VSE	neg
	POWER/VSE	neg

AMES
PERSONNEL

For further details and an application form please phone or call in.

Employment Agency Suite 14, Orydan Chambers,

119, Oxford Street, London, W1R 1PA Tel. 01-434 1106

OPERATIONS
SUPERVISOR

S. HARROW c. £5,000.

Pioneer, an expanding Multi-national company with interests in ready-mix concrete, quarrying and asphalt is installing a Honeywell 62/50 128k Disk/Tape computer and require an experienced Operations Supervisor to join our O.P. Team.

Previous operating experience is essential. A knowledge of Honeywell Level 62 G COS and JCL would be an advantage.

The position involves supervision of operations and ancillary staff, job scheduling and control of operations procedures.

Benefits include a competitive salary and contributory staff pension scheme.

PIONEER

Contact: Roger Marquet on
(01) 884 8511, or write to:
U.K. Systems Manager
Pioneer Concrete (Holdings)
Ltd., 58-60 Northolt Road
South Harrow, Middx.

HALTON BOROUGH COUNCIL
CHIEF FINANCE OFFICER'S DEPARTMENT
COMPUTER SECTION

An Order has been recently placed for an ICL 2904 with Ocas, Magnetic Tapes and ODE's to replace the present ICL 1901 installation and is due to be commissioned in the Autumn. It is envisaged that future developments will cover a wide range of applications including on-line systems.

SENIOR ANALYST/
PROGRAMMER

Grade AP5/SO1 £4,773-£5,888

Applications are invited for the above posts from persons with several years systems experience using Ocas and Tapes and a programming background which includes COBOL. The successful applicant must be able to take charge of a system from investigation to implementation and be capable of negotiating with user Departments. A knowledge of ICL 2903 job control language and direct data entry equipment is desirable but not essential.

ANALYST/PROGRAMMER

Grade AP3/S £3,732-£5,073

Applicants must have at least 2 years' COBOL programming experience using Ocas and Tapes and a minimum of 1 year's systems analysis work. The above posts are based in Widnes, and a system of flexible working hours is in operation. The Council will be willing to pay in an appropriate cases reasonable removal expenses and make available accommodation to the successful applicant.

Applications in writing, giving details of age, qualifications, experience, together with the names and addresses of two referees, should be forwarded to the Head of Personnel and Management Services, Halton Borough Council, Municipal Building, Kingsway, Widnes, Cheshire, WAB 7GF. Closing date 21st July, 1978.

R. Turton
Chief ExecutiveGemini Contracts
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contract opportunities
for experienced
programmers

— Register with an
International Software
Organisation

Tel. 01-828 6634
Home 01-274 1293

Sirkbeck College
(University of London)

PROGRAMMERS

Two appointments are to be made, each associated with a specified group of departments.

In both posts the work involves a wide variety of applications. Computing systems to be used include CDC 7600, 6600, IBM 370, ICL 2980, DEC 4080.

Candidates should be holders of a degree in Computer Science, or have equivalent experience or qualifications. Salary at an appropriate point on the scale £3,084-£5,061 including London weighting.

For further details telephone 01-680 0622 extension 254. Applications, by letter to Central Computing Service, Sirkbeck College, Mole Street, W.C.1

PROGRAMMERS
SYSTEMS ENGINEERS to £9,000
CONSULTANTS

INFORMAL INTERVIEWS

CAFE ROYAL, REGENT STREET
TUESDAY, 18th JULY

If a challenging career in an expanding top consultancy, where you will be working with a variety of computers in many application areas appeals to you, then please drop in for a drink and a chat with our managers and consultants. We are at the Cafe Royal, Regent Street, on Tuesday, 18th July, from 12 noon until 6 p.m. where we shall be pleased to discuss your career prospects within our Company.

If you cannot make it, telephone Bill Hockley on Camberley (0252) 63471 or write to him at:

SYSTEMS DESIGNERS LIMITED
Systems House
57-61 High Street
Frimley, Camberley
Surrey GU10 5HH

Located at Frimley, Surrey, Systems Designers Limited is an independent British systems consultancy with an unrivalled reputation in mini and micro computer applications.

Established in 1965 and currently 150 strong, the company is expanding its operations in both the UK and abroad. A full order book and continued demands for our high quality service have produced an immediate requirement for a number of professional programmers, systems engineers and consultants.

Current projects are challenging and rewarding and the company policy of full participation and involvement of all members offers broad prospects and opportunities for rapid progress for top people.

Requirements exist in all areas for applicants with a good academic background and at least one year's software experience and who are able to demonstrate a capability to work in new areas of mini and micro computer applications. Principal areas of involvement are:

Basic Systems
Design of both new languages and compilers, consultancy, and development of micro based products.

Communications
Working in the fields of Message Switching (Military and Civil), Circuit Switching and Auto Telex Switching, mini and micro based systems.

Real Time Systems
Predominantly defence and involves the application of advanced techniques to engineering or mathematical problems.

Industrial
Design and development of Process Control and Data Logging Systems. RSC if experience especially interesting.

Salary is negotiable according to ability and experience, with optional BUPA and pension schemes, profit sharing and assistance with removal, where necessary. You will be based in modern offices in Frimley (Waterloo 48 mins, M3 2 mins). Opportunities will occur for those interested in working in Europe. An active Sports and Social Club organises activities such as bridge, squash, football, cricket and regular dances and social functions.

01-274 1293

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Macro 11, RTLII, Coral,
Assembler-level languages,
all high-level languages.

Quite modest experience on top of one of those could put you up in the 8-figure salary class.

And experience of operating system RSX11M as well would pretty well clinch it for you.

As for micro languages, absolutely anything's marvellous. But if you have Intel 8080 or 8085, you have it made like Paul Newman used to.

Particular applications right now:

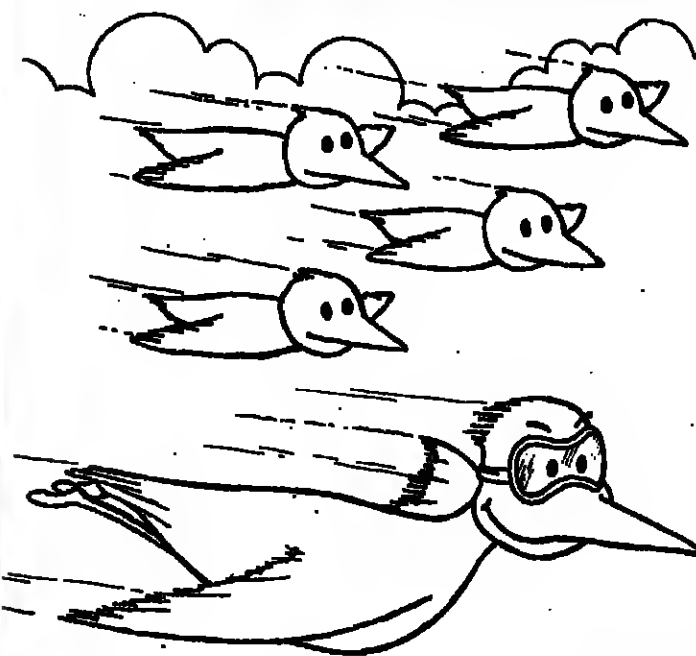
Micro processing, word processing, process control, message switching, flight simulation, radar systems, automated telex systems, communications, diagnostic programming, video typing systems, composition and typesetting.

Ring up Beryl McLaren on 01-836 9719 or 9882. And just speak your language.

Jupiter Computer Appointments
(Real Time Mini's Place)
Suite 43, 12-13 Henrietta Street,
London WC2

MYRIAD

A CHANCE FOR YOU TO LEAD THE WAY!

SENIOR ANALYST/PROGRAMMER
(TEAM LEADER)

BERKS/BUCKS BORDER
We are seeking a SENIOR PROGRAMMER or ANALYST/PROGRAMMER keen to enhance their career by becoming further involved in Systems Analysis and Design.
The position offers:-
* Team Leading responsibility
* Systems Design and Development Involvement
* Training in IMS and TP Software Applications
* The Opportunity to Gain On-Line Real-Time Experience
Suitable applicants will have at least three years commercial data processing experience with an in depth knowledge of COBOL. The Company offers RELOCATION ASSISTANCE, FIVE WEEKS HOLIDAY and an excellent starting salary.

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CONTROL DATA, producer of the world's largest computers and leader in providing total computer services throughout the world has immediate openings at its Cybernet Centre Europe in Brussels for

Systems Software Analyst
Trainee Software Analyst

Candidates should have experience in maintenance of operating systems software for large scale computer systems and in a high level language.

CONTROL DATA is expanding its CALL 370 time-sharing service which is run on Control Data IBM compatible mainframes and has openings for

Applications Analyst

for Customer Services

Candidates should have experience with maintenance of applications packages in a time-sharing environment. Experience on IBM machines is desirable but not essential.

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Candidates should have experience in assembler plus OS/VS or MVS for maintenance of operating systems software on medium scale IBM 370 systems.

For all openings, English is essential and knowledge of French or Dutch desirable. The company offers to successful applicants good working conditions as well as an attractive package of compensations plus legal and extra legal benefits.

Please send detailed c.v. to:

Control Data
Cybernet Europe Inc.
Attn.: Personnel Department,
Rakettstraat 50 rue de la Fusée,
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A branch of the largest supplier of DEC mini-computers in Europe require experienced computer staff to design and implement commercial systems using on-line techniques on DEC hardware.

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Other benefits include: Contributory pension scheme, travel expenses and discretionary bonus scheme.

For more information and application form please write to Gamme Business Systems, 27 High Street, Thomas Ditton, Surrey, or ring Tony Simpson, 01-398 7235 (daytime) or 01-458 7493 (evening).

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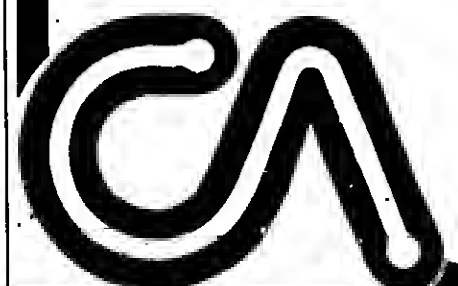
Computer Automation is the world leader in minicomputer technology and the Naked Mini Division requires additional staff based from the European Headquarters in Hertfordshire.

Sales professionals who have a proven track record and management potential are required to sell our expanding range of OEM minicomputers in all parts of the country.

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Please send CV or telephone Niel Clements on Rickmansworth 71211 or write to:



Computer Automation
CAI Limited (Computer Automation)
Hertford House, Denham Way,
Rickmansworth,
Hertfordshire WD3 2XD.

MYRIAD
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Computer Personnel Consultants

NEW SYSTEMS

BEDFORDSHIRE

PROGRAMMERS c £4,500
ANALYST/PROGRAMMERS c £5,500

Having employed their IBM 370/125 for highly specialised marketing systems covering their range of products, our client, a division of a major British Company, is now about to embark on the development of a complete range of commercial systems. This is an ideal opportunity for keen data processing professionals to become involved in the initial stages of projects and see these to successful implementation. It is expected the first phase will incorporate STOCK RECORDING, SALES AND STATISTICS and LEDGERS and it is envisaged that this will be part of a total Management Information System.

The positions offer the opportunity of joining project teams and becoming actively involved in applications from feasibility study to successful implementation. A sound COBOL or ASSEMBLER background is a prime requirement for success in these roles.

Apart from attractive salaries and prospects, the company also offer very favourable relocation expenses and other fringe benefits.

Ref. NB/1307

24-hr. answering service
Please telephone for a confidential discussion or write to:
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BURROUGHS
SOFTWARE
PROGRAMMER

Woking-£5,225

Due to internal promotion we have an opportunity for a software programmer to take responsibility for, and to develop, a wide range of in-house software utilities.

Candidates with Burroughs medium systems experience should ideally have a sound knowledge of COBOL, a working knowledge of assembler and have worked in a data communications

environment.

The current B3700 equipment is to be supplemented by a B2815 in Oct. 1978. Company benefits include flexitime, free lunches and modern working conditions.

For an application form please contact **Marguerita Baldock, Personnel Officer, B.A.T. (UK AND EXPORT) LTD., Export House, Woking, Surrey GU21 1YB.**



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Pay Award 1st July, 1978

To work in a team which provides software and user support for Transportation and Civil Engineering applications on a Univac 1100 - 11 computer. Some work on a real-time Traffic Signal Control System may be involved from time to time. Applicants should be of degree standard with several years' appropriate experience. Salary is inclusive of phase I and phase II pay supplements. Temporary housing may be available. Relocation expenses payable up to £575 plus a lodging allowance in appropriate circumstances.

Application forms and further details from the County Engineer & Surveyor, County Hall, Glenfield, Leicester, LE3 8RJ. Telephone Leicester (0533) 871313, ext. 7422.

Closing date Monday, 7th August, 1978.

STRATHCLYDE
REGIONAL COUNCIL

Education Department

Applications are invited for both unfilled posts in the Computer Unit at Glasgow College of Technology, Cowcaddens Road, Glasgow G4 0BA.

USER SERVICES MANAGER Ref. 0389
Salary Scale - 802 - 1285 plus supplement of £820 per annum

The successful applicant should be a Graduate with substantial programming experience, preferably in educational computing services, DEC, 10 or DEC 20 experience an advantage.

SYSTEMS PROGRAMMER Ref. 0384
Salary Scale - APV - £4546-£4968 plus supplement of £820 per annum

The successful applicant should be a Graduate or equivalent with systems programming experience, preferably on DEC 10 or DEC 20 systems.

Application forms may be obtained from The Assistant Director of Manpower Services, 21 Gordon Street, Glasgow, G1 3PE, to whom completed forms, quoting appropriate Ref. No. should be returned by 21st July, 1978.

R. M. O'NEILL
Director of Manpower Services

DISCUS

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DCSL
is a successful bureau and software house using both main-frame and minicomputers of various makes. Due to expansion of our services the following staff are required:

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PROGRAMMERS
Up to £5,000

To work with mainframe and mini computers, often on clients' premises; some time spent away from home should therefore be anticipated.

Applications with brief career details to:
D. R. Brown, Director
DISTRIBUTION COMPUTER SERVICES LTD.
High Field House
High Field Road, Levenshulme,
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Tel. 061-224 3274

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— BRISTOL AREA

— with at least one year of commercial systems analysis experience.
— with proven abilities to solve complex and ill-defined problems and implement the solutions.

Our expanding DP department requires an enthusiastic and competent systems analyst to work in the Bristol area on on-line applications. Applicants, providing they meet the basic requirements, can look forward to being given full training where applicable.

The Corporation is currently seeking to expand and diversify its data processing activities into full on-line processing using mainframes and mini computers. This promises interesting and varied career prospects for the right person who takes this opportunity of joining now, both inside and out of Data Processing.

Please apply to T. A. Hewitson — Data Processing Manager

Heron Corporation Limited
19 Marylebone Road
London NW1 5JL
01-248 1315

Interviews will be held
in Bristol and London

Heron Corporation Limited

COMPUTER CAREERS IN SINGAPORE

WITH

SINGAPORE AIRLINES



The Company currently operates three large scale IBM 360 computers which will be progressively replaced by newer and larger computers beginning this year. Many new real-time and batch applications are being planned for implementation in the next few years. To cope with this expansion we need several computer professionals to join the Company's data processing team.

Singaporeans and Malaysians are invited to apply for the following positions:

APPOINTMENT

SENIOR SYSTEMS ANALYST
SENIOR SYSTEMS PROGRAMMER
SYSTEMS ANALYST
SYSTEMS PROGRAMMER

REQUIREMENTS

University Graduate with at least two years' experience in systems and programming work.

DATA BASE ADMINISTRATOR
COMMUNICATIONS ENGINEER

University Graduate with at least two years' experience in computer and/or communications work.

Salary will be commensurate with qualifications and experience with the salary scale \$41050 x 60 — \$31850/\$31725 x 75 — \$24200 per month.

Attractive fringe benefits include:

- * Free travel on company services during annual leave and concessional travel on attractive terms on other carriers;
- * Free medical and dental treatment; and
- * Annual wage supplement equivalent to one month's basic salary.

A team will be in London during the last week of July, 1978, to conduct interviews.

Interested eligible applicants should contact:

Administration Department
SINGAPORE AIRLINES LIMITED
550-588 Chiswick High Road
London W4
Tel: 01-995 4801

for an appointment. Applicants should bring their letters of application and relevant documents to the interview.

AMPEX

AMPEX

COMPUTER SALES ENGINEERS

Amplex, world leader in the manufacture and marketing of a complete range of memory systems and media, needs additional sales engineers due to the continuing growth of the Computer Products Division based at Reading. We are looking for sales oriented people who have a background in computer peripheral and/or systems to sell magnetic disc, tape and core memory products throughout the United Kingdom.

This is an opportunity to work with a dedicated and progressive sales team with excellent career prospects, competitive salary and substantial commission, training plus company car. We also offer a comprehensive pension and life assurance scheme. Please apply for application form to Mrs. J. R. Taylor, Personnel Manager, Amplex Great Britain Limited, Acle Road, Reading, Berks. Telephone Reading 85200.